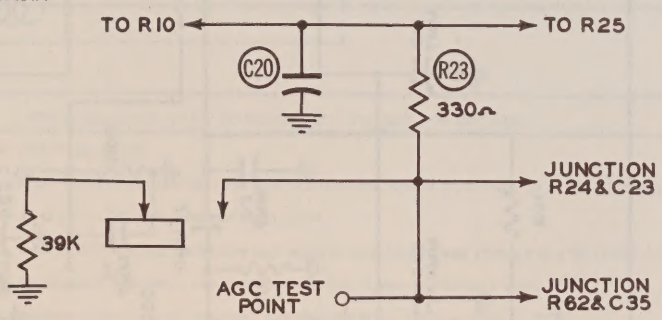
CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Dumont	RA-164, RA-165 Tel. Rec. Prod. Chg. Bul. 60	194-1
Firestone	13-G-110A, 13-G-115, 13-G-116, 13-G-119, 13-G-120 Tel. Rec. Prod. Chg. Bul. 60	194-1
General Electric	21C201, 21C202, 21C204, 21C206, 21C208, 21C214, 21T1 Tel. Rec.	194-2
Grommes	LJ-2	194-3
Hoffman	7M112B, 7B113B, 7P114B (Ch. 212, 212M), 21B122, 21B306B, 21B507, 21M121, 21M305B, 21M506, 21P123, 21P307B, 21P508 (Ch. 211, 211M) Tel. Rec.	194-4
Hudson Electronics	11, 312H	194-5
Jewel	5200	194-6
Mallory	TV-101 (Below Serial No. 200,000) UHF Conv.	194-7
Mallory	TV-101 (Serial No. 200,000 and Above) UHF Conv.	194-8
Motorola	17T11E (Ch. TS-400A), 17T13 (Ch. TS-410A) Tel. Rec.	194-9
Pilot	AF-821A, U	194-10
RCA Victor	2C521, 2C522, 2C527 (Ch. RC1120, A)	194-11
Stewart-Warner	9202-A, -B, -C, -DA, -DB, -DDA, -E, -F, -FA (Series "M") Tel. Rec. Prod. Chg. Bul. 60	194-1
Stromberg-Carlson	AR-410	194-12
Truetone	2D1354A Tel. Rec.	194-13
Wells-Gardner	321MS31C-222, -224, -272, -274, -276, -280, -282, -284, -296 Tel. Rec.	194-14

PROPERTY OF
L. F. BLANKENSHIP
3024 MEADE ST.
DENVER, COLORADO

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 7 IN SET 189

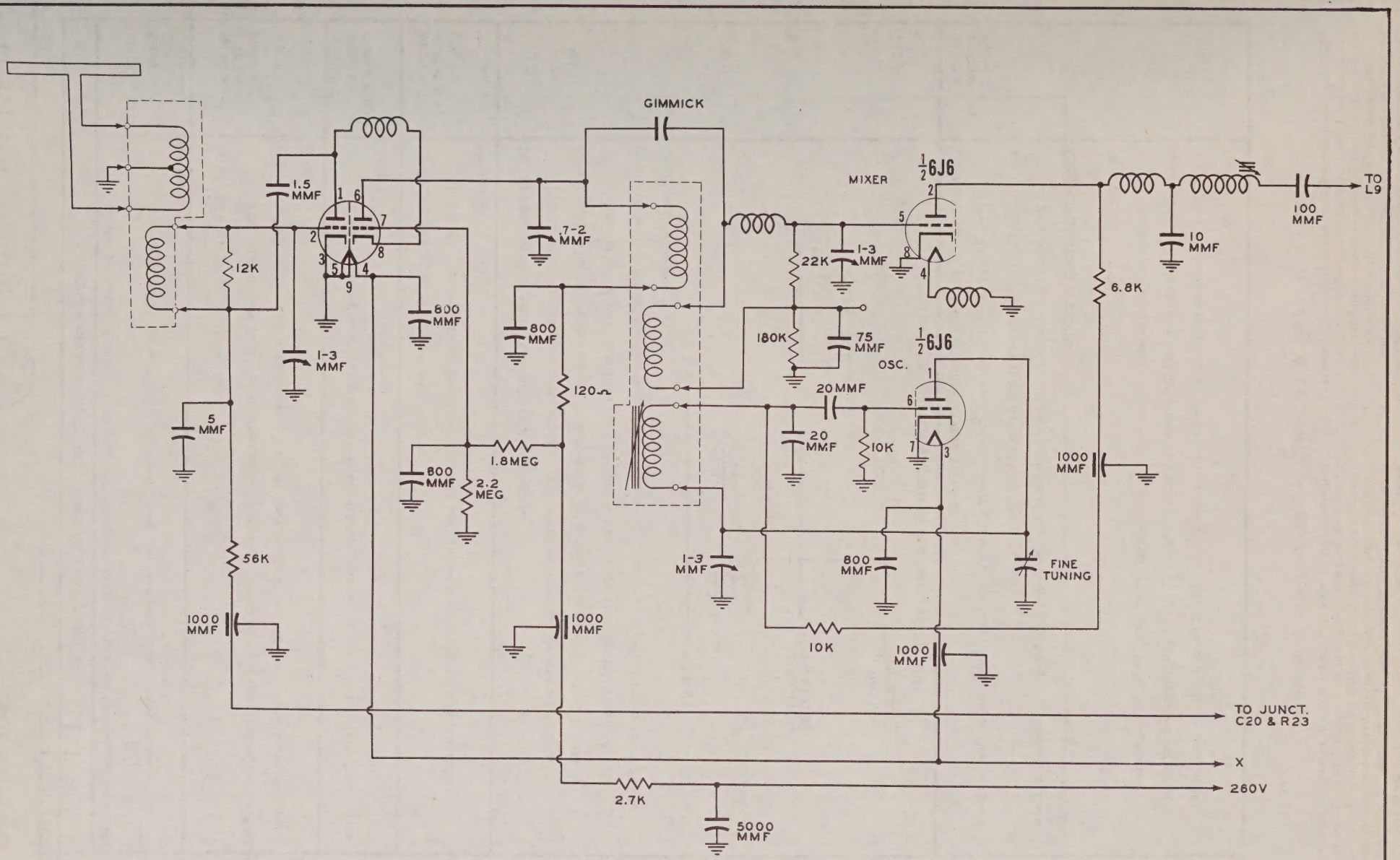
Serial No. 656611 Coded C-2	In later production of Dumont Models RA-164 and RA-165 the following production changes were made. Production changes through Serial No. 656611, Code C-2, are covered in Photofact Folder 7 in set 189.
Serial No. 657071 & Up Coded C-3	TO REDUCE MIXER THERMAL NOISE R23, located in the AGC Circuit, was changed from 33KΩ to 330Ω and R24 was changed from 47KΩ to 82KΩ. The AGC input lead was disconnected from the junction of C20 and R23 and reconnected to the junction of R23 and R24.
Serial No. 6514000 & Up	The 1KΩ resistor connected in series with the 47MMF capacitor across yoke terminals 2 and 3 were omitted.
Serial No. 6522466 & Up Coded C-4	TO ELIMINATE SYNC BUZZ IN AUDIO The Ratio Detector Diode Load Resistors, R54 and R55, were changed from 6.8KΩ to 15KΩ resistors.
	TO IMPROVE SYNC STABILITY IN NOISY FRINGE AREAS An AGC switch was added to the chassis. This switch is physically located behind the hidden control panel on the front of the set and is connected in the circuit at the junction of R23 and R24. When in the "Fringe" position a 33KΩ resistor is added in parallel with R24 to ground. The circuit remains as before when the switch is in the "Normal" position. A partial schematic of the new circuit is given below.  AGC SWITCH SHOWN IN NORMAL POSITION
Serial No. 6526306 & Up Coded C-5	TO INCREASE PICTURE DRIVE AND CONTRAST RANGE C28 and R24 were removed from the cathode (Pin 1) of V6, the 12BY7 Video Output Tube and Pin 1 was connected to the junction of R41 and R1A (Contrast Control). Brightness Control voltage divider resistor R48 was changed from 1.5Meg to 1.2Meg and R49 was changed from 470KΩ to 390KΩ. NEW TUNER Some sets in later production runs employ a different RF Tuner (Part #89012601). This tuner is electrically and mechanically interchangeable with the tuner (Part #21012781) originally used and either of the above units may be used in later production. A partial schematic of the new tuner is given on the reverse side.

DUMONT MODELS RA-164, RA-165

PRODUCTION CHANGES
BULLETIN 60

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America


GIMMICK
MIXER
½6J6
OSC.
½6J6
TO L9
100 MMF
10 MMF
6.8K
22K
1-3 MMF
180K
75 MMF
20MMF
20 MMF
10K
1000 MMF
1.5 MMF
12K
1-3 MMF
5 MMF
56K
1000 MMF
800 MMF
1.8MEG
2.2 MEG
800 MMF
120Ω
7-2 MMF
800 MMF
1000 MMF
1-3 MMF
800 MMF
FINE TUNING
10K
1000 MMF
TO JUNCT. C20 & R23
X
260V
2.7K
5000 MMF

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 9 IN SET 172

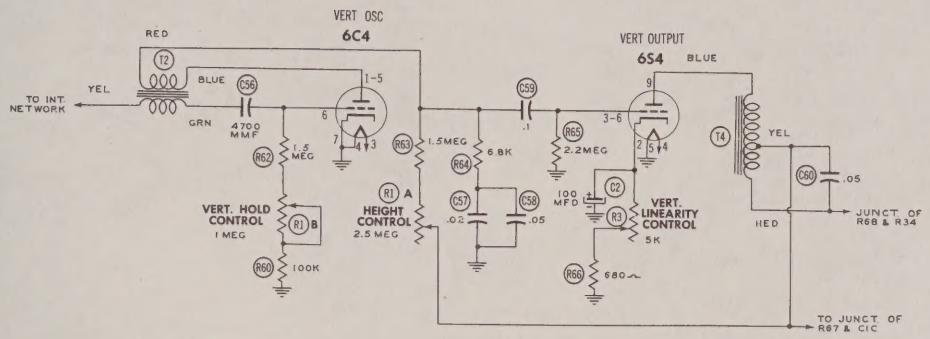
Chassis Coded "Series M"

In later production of Stewart Warner Models 9202-A, -B, -C, -DA, -DB, -DD, -DDA, -E, -F, -FA, coded "Series M", the vertical sweep circuit was modified as follows:

V12, the 6BL7GT, vertical oscillator and Vertical Output Tube was replaced by 2 separate tubes: A 6C4 is used as the vertical oscillator an a 6S4 is used as the vertical output tube.

The value of all the related components remains the same in the new circuit except R61 was omitted and R62 was changed to 1.5Meg. A partial schematic of the revised circuit is given below.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



STEWART WARNER MODELS 9202-A, -B, -C, -DA, -DB, -DD, -DDA, -E, -F, -FA (Series M)

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 5 IN SET #182

Ch. Code Dated 2434 and later

UNSTABLE VERTICAL HOLD

In order to correct unstable vertical hold in Firestone Models 13-G-110A, 13-G-115, 13-G-116, 13-G-119 and 13-G-120 to following changes were made.

V16, the 6BL7GT vertical oscilliator and vertical output tube, was changed to a 6SN7GTA tube.

R84, B+ dropping resistor, was changed from 15K, 2 watt to 6800Ω, 2 watt.

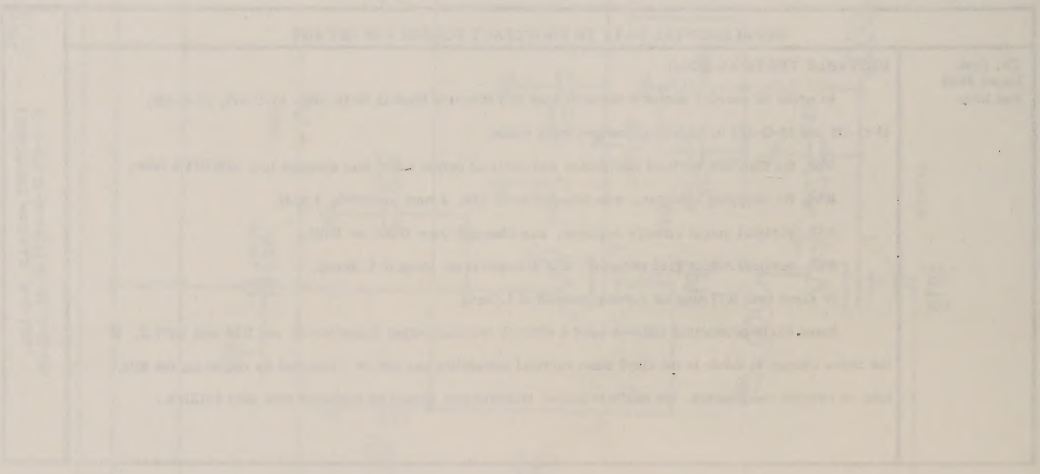
R82, vertical output cathode resistor, was changed from 1500Ω to 820Ω.

R83, vertical output grid resistor, was changed from 1meg to 2.2meg.

In some sets R77 may be 1.8meg instead of 1.5meg.

Some early production chassis used a #51X159 vertical output transformer and R84 was 3300Ω. If the above change is made in the field when vertical instability can not be remedied by replacing the 6BL7 tube or related components, the vertical output transformer should be replaced with part #51X156.

FIRESTONE MODELS 13-G-110A, 13-G-115, 13-G-116, 13-G-119, 13-G-120



PHOTOFACT* Folder

*TRADE MARK

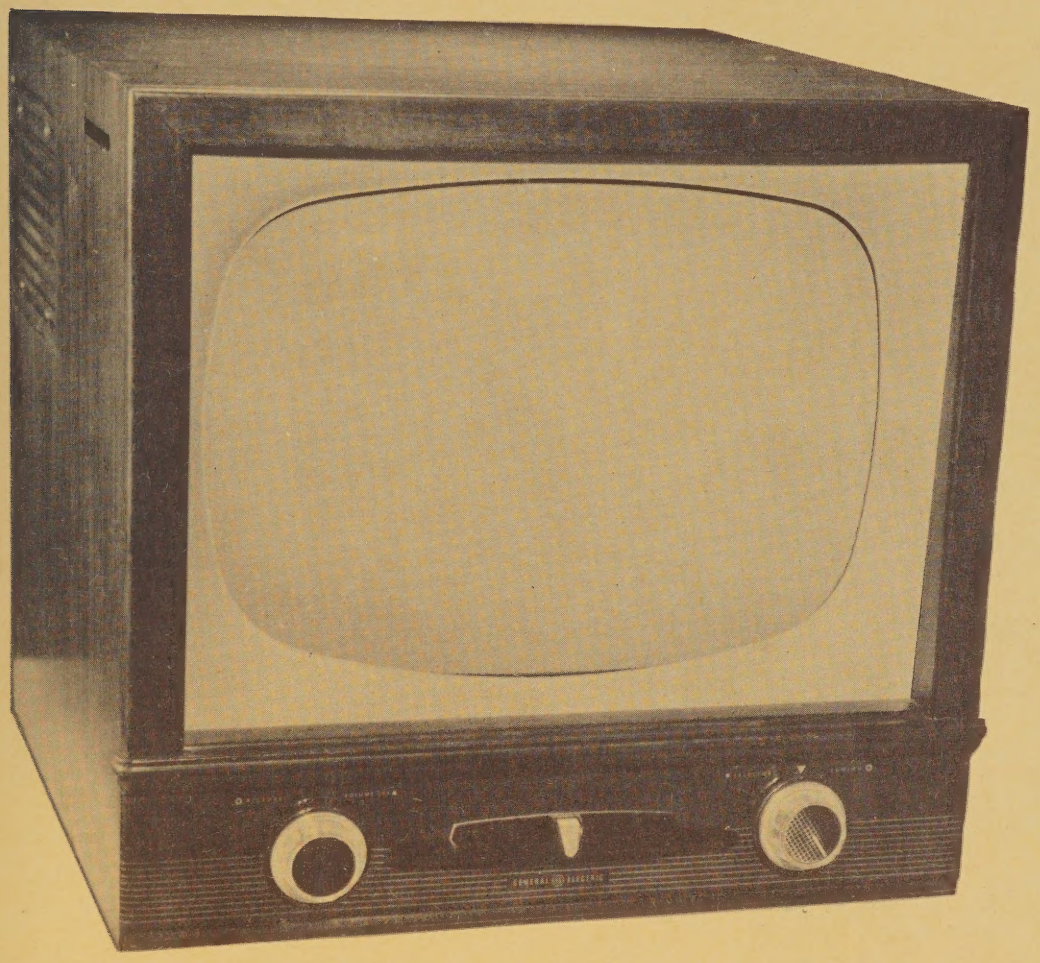
GENERAL ELECTRIC MODELS 21C201, 21C202, 21C204, 21C206, 21C208, 21C214, 21T1

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



MODEL 21T1

GENERAL ELECTRIC MODELS 21C201, 21C202, 21C204, 21C206, 21C208, 21C214, 21T1

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

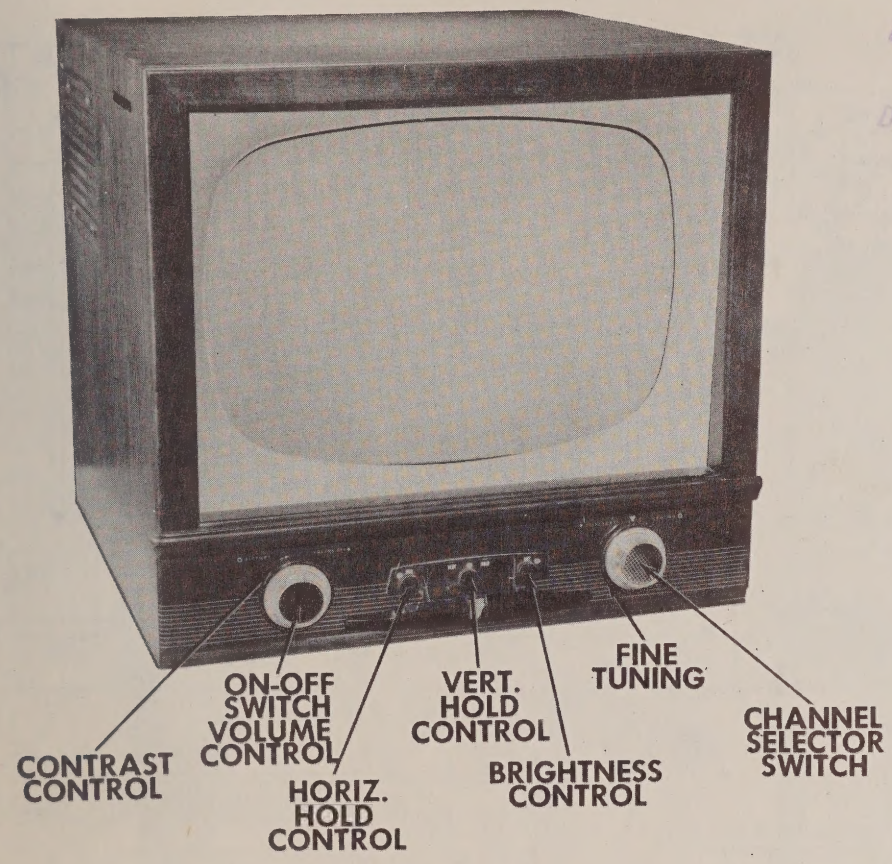
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 2–53 SET 194 FOLDER 2

PHOTOFACT* Folder
TRADE MARK

GENERAL ELECTRIC MODELS 21C201, 21C202, 21C204, 21C206, 21C208, 21C214, 21T1

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



General Electric Model 21T1

TRADE NAME	General Electric Models 21C201, 21C202, 21C204, 21C206, 21C208, 21C214, 21T1
MANUFACTURER	General Electric, Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	Television Receiver
TUBES	Twenty-three
POWER SUPPLY	110-120 Volts AC - 60 Cycle
RATING	1.68 Amp. @ 117 volts AC
TUNING RANGE—	Channels 2 thru 13, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

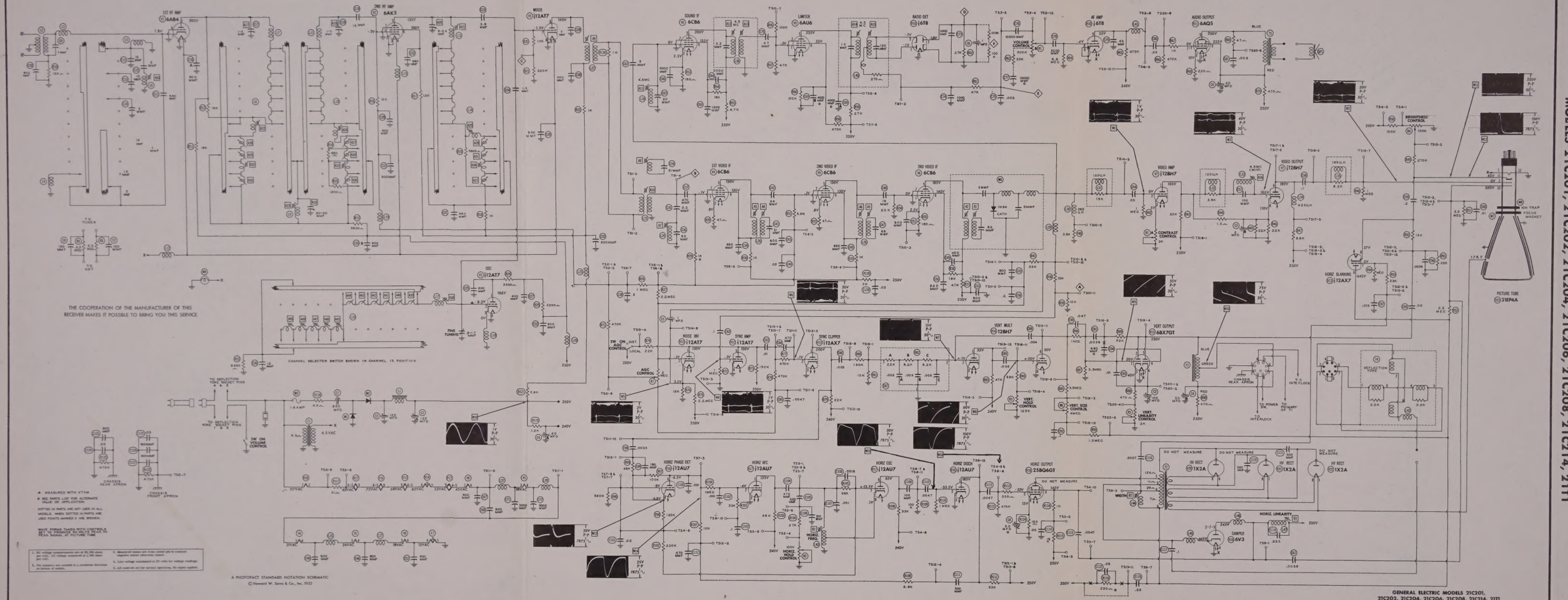
INDEX

Alignment Instructions 6, 7
Disassembly Instructions 18
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions ..... 13 thru 16
Photographs
Cabinet - Rear View 11
Capacitor and Alignment Identification 4, 9
Chassis - Top View 3
RF Tuner 10
Photographs (Cont).
Resistor and Inductor Identification 19, 20
Resistance Measurements 8
Schematic 2
Servicing in the Field 18
Terminal Strip Location Chart 16
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

GENERAL ELECTRIC MODELS 21C201, 21C202, 21C204, 21C206, 21C208, 21C214, 21T1

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America



THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

▲ MEASURED WITH VTVM

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.

WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE SIX VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements are at 25,000 ohms per volt. AC voltage measured at 1,000 ohms per volt.
2. Pix resistors are counted in a clockwise direction at bottom of section.
3. Measured values are from socket pin to common negative point otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. AGC controls set for normal operation, No signal applied.

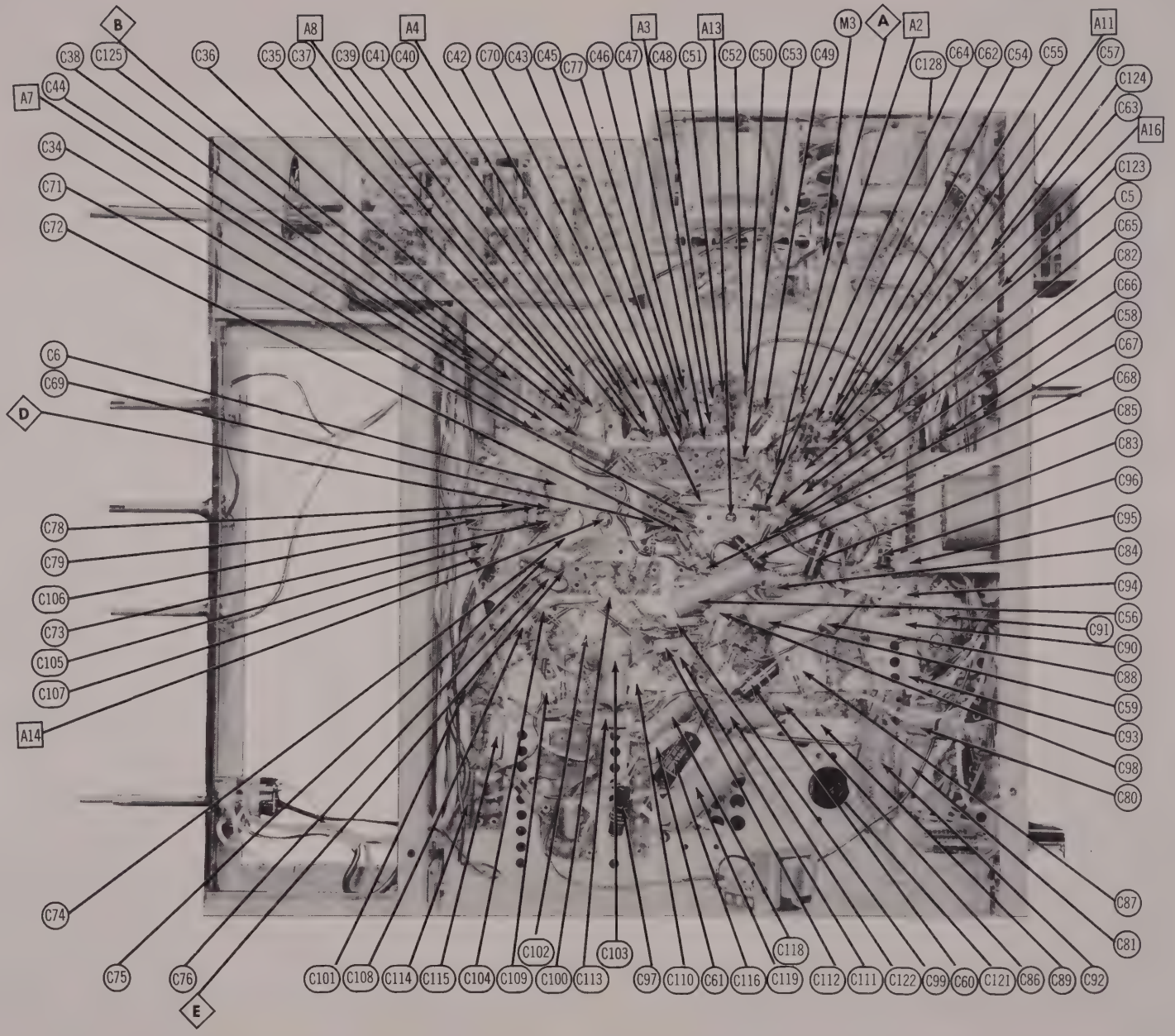
A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1953

GENERAL ELECTRIC MODELS 21C201, 21C202, 21C204, 21C206, 21C208, 21C214, 21T1

CHASSIS TOP VIEW

PROPERTY OF
L. F. [illegible]
DENVER, CO



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1	1st. RF Amplifier	6AB4	6AB4	5CE	
V2	2nd. RF Amplifier	6AK5	6AK5	7BD	
V3	Converter	12AT7	12AT7	9A	
V4	1st. Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Amplifier				
	Video Output	12BH7	12BH7	9A	
V8	Sound IF Amp.	6CB6	6CB6	7CM	
V9	Limiter	6AU6	6AU6	7BK	
V10	Ratio Detector				
	AF Amplifier	6T8	6T8	9E	
V11	Audio Output	6AQ5	6AQ5	7BZ	
V12	Sync Amplifier				
	Noise Inverter	12AT7	12AT7	9A	
V13	Sync Clipper				
	Horiz. Blanking	12AX7	12AX7	9A	
V14	Vert. Oscillator	12BH7	12BH7	9A	
V15	Vert. Output	6BX7GT	6BX7GT	8BD	
V16	Horiz. Phase Det.				
	Horiz. Discharge	12AU7	12AU7	9A	
V17	Horiz. AFC				
	Horiz. Oscillator	12AU7	12AU7	9A	
V18A	Horiz. Output	25BQ6GT	25BQ6GT	6AM	
B	Horiz. Output	25AV5	25AV5	6CK	
V19	Damper	6V3	6V3	9BD	
V20	HV Rectifier	1X2A	1X2A	9Y	
V21	HV Rectifier	1X2A	1X2A	9Y	
V22	HV Rectifier	1X2A	1X2A	9Y	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: SYLVANIA PART No.	RTMA BASE TYPE	NOTES
V23	21EP4A	21EP4A	12D	① Circuit changes necessary
		21EP4 ①	12D	
		21FP4 ①	12C	
		21FP4A ①	12C	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	300	150	RCE-148	E4A147		XA005		FP119	TVL-1434	
C2	125	350	RCE-147	E4A148		XA012		FP140	TVL-1638	
C3A	▲125	350	RCE-145	E4C504					TVL-3610	
B	■5	200								
C	▲100	75								
C4A	▲40	300		AFH3-42		C033		FP419.7		
B	■30	300		PRS25/50		BR502A				
C	50	25								Note 1
D	▲20	300								
C5	1	50	RCE-090	PRS150/4		BBR-1-50T		TC31	TVA-1300	
C6	1	50	RCE-090	PRS150/4		BBR-1-50T		TC31	TVA-1300	
C7	150	500	UCU-1532	1468-00015	D6-151	5W5T15	GP2K-151	MC236	1FM-315	
C8	150	500	UCU-1532	1468-00015	D6-151	5W5T15	GP2K-151	MC236	1FM-315	
C9	1				TCZ-1		NP0K-010			
C10	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C11	680			SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C12	10			SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C13	10			SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C14	5			SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C15	5	500		1469-000005		5R5V5		MCB205	MS-55	
C16A	800			BPD-0008	DD-801	TM5T8	812-001	DCD-521	5HK-2D1	
B	800			BPD-0008	DD-801	TM5T8				
C17	1-5									
C18	1-5									
C19	15				TCZ-15		NP0K-150		5TCC-Q15	
C20	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C21	680			SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C22	680			SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C23	3.9						NP0K-3R9			
C24	1.5				TCN-1.5		N750K-1R5		5TCUB-V15	
C25	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C26	12									
C27	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C28	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C29	5	500		1469-000005		5R5V5		MCB205	MS-55	
C30	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C31	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C32	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C33	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C34	51	500	UCG-2021	1469-00005		5R5Q5		MCB225	MS-45	
C35	2.2		RCW-3078		TCZ-2.2		NP0K-2R2		5TCCB-V22	
C36	62	500	UCG-2023							
C37	470	500	UCG-2044							
C38	.5	200	UCC-052	P288-5		PJ2P5		PT405	2TM-P5	
C39	680		RCW-3051	SI680	D6-681	5W5T7	GP2K-681	UC-5368	5GA-T68	
C40	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C41	51	500		1469-00005		5R5Q5		MCB225	MS-45	
C42	24		RCW-3050	1469-000025		5R5Q25	NP0K-240	MCB220	MS-425	
C43	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C44	.05	200	RCC-105	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C45	680		RCW-3051	SI680	D6-681	5W5T7	GP2K-681	UC-5368	5GA-T68	
C46	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C47	68	500		1469-00007		5R5Q7			MS-47	
C48	18	500	UCG-2010						MS-42	
C49	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C50	820		RCW-3052							
C51	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C52	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C53	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C54	.05	200	RCC-105	P288-05	DF-503	PJ2S5		PT415	2TM-S5	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C55	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C56	.2	200	UCC-014	P488-22		PTE4P22		TP429	2TM-P22	
C57	100	500	UCU-1528	1469-0001		5R5T1		MCB235	MS-31	
C58	.1	600	RCN-031	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C59	.2	200	UCC-014	P488-22		PTE4P22		TP429	2TM-P22	
C60	.01	600	UCC-040	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C61	.0039	600	RCN-034	1464-004		1DR5D4		MCB463	MS-24	
C62	5	500	UCG-1005	1469-000005		5R5V5		MCB305	MS-55	
C63	20	500		1469-00003		5R5Q2			MS-42	
C64	5000		RCW-3014	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C65	1300		RCW-3053							
C66	5000		RCW-3014	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C67	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C68	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C69A	4000			BPD-2X004	D6-402	TM5DD4	822-004	DCD-524	5HK-2D4	Note 2
B	4000				D6-402					Note 2
C70	47	500	UCU-520	1468-00005	D6-470	5W5Q5	GP1K-470	MC235	1FM-45	
C71	5000		RCW-3014	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C72	5000		RCW-3014	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C73	5000		RCW-3014	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C74	1000	500	RCC-116	1468-001	D6-102	1W5D1	GP2L-102	MC255	1FM-21	
C75	.002	200	UCC-036	P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	
C76	10000		RCW-3054	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C77	10000		RCW-3054	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	Note 3
C78	5000		RCW-3014	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C79	43	500	UCG-2019							
C80	.05	600	UCC-045	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C81	.008	1000	UCC-081	P1068-008		PTE1SD8		PT1628	MB-D8	
C82	.1	200	RCC-103	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C83	.01	600	RCN-063	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C84	470	500	UCU-544	1468-0005	D6-471	5W5T5	GP2K-471	MC245	1FM-35	
C85	.0047	600	RCN-051	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C86	.003	600	UCC-037	P688-003	D6-302	PTE6D3	GP2-333-302	PT623	6TM-D3	
C87A	.002			P688-002		PTE6D2		PT622		
B	.005		*REK-001	P688-005	◆PC-100	PTE6D5	◆1405-01	PT625	◆101C1	
C	.005			P688-005		PTE6D5		PT625		
C88	.004	600	UCC-039	P688-004	D6-402	PTE6D4	GP2-333-402	PT624	6TM-D4	
C89	.056	600	RCN-064							
C90	.047	600	RCN-041							
C91	.0039	600	RCN-034	1464-004		1DR5D4		MCB463	MS-24	
C92	.1	1000	UCC-088	P1088-1		PTE1SP1		PT1601	MB-P1	
C93	.01	600	RCN-025	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C94	680	500		1469-0007		5R5T7			MS-37	Note 1
C95	.02	600	UCC-041	P688-02	DF-203	PTE6S2		PT612	6TM-S2	
C96	.0039	600	RCN-034	1464-004		1DR5D4		MCB463	MS-24	
C97	.015	600	RCN-068							
C98	.0033	600	RCN-068							
C99	180	500	RCU-3107							
C100	.001	1000	UCU-1052							
C101	.02	600	UCC-041	P688-02	DF-203	PTE6S2		PT612	6TM-S2	
C102	.001	600	RCN-062	1464-001		1R5D1		MCB255	MS-21	
C103	.1	600	RCC-103	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C104	470	500	UCU-1544	1469-0005		5R5T5		MCB245	MS-35	
C105	220	500	UCG-1036							
C106	100	500	UCU-1528	1469-0001		5R5T1		MCB235	MS-31	
C107	.001	600	RCN-062	1464-001		1R5D1		MCB255	MS-21	
C108	.0018	600	RCN-033							
C109	100	500	UCU-1528	1469-0001		5R5T1		MCB235	MS-31	
C110	.0047	600	RCN-051	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C111	300	500	RCU-308	1469-0003		5R5T3		MCB241	MS-33	
C112	470	500	UCU-1544	1469-0005		5R5T5		MCB245	MS-35	
C113	.0047	600	RCN-051	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C114	400	400	UCC-045	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C115	.0047	600	RCN-051	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C116	.0027	3000	RCN-069							
C117	.1	1000	UCC-088	P1068-1		PTE1SP1		PT1601	MB-P1	
C118	.025	600	RCC-101	P688-025				PT615	6TM-S5	
C119	.25	600	UCC-050	684-25		PTE6P25		PT6025	6TM-P25	
C120	500	20000	RCN-035	HV20C	TV3-502	MM-C20T5	413-501		20DK-T5	
C121	500	20000	RCN-035	HV20C	TV3-502	MM-C20T5	413-501		20DK-T5	
C122	.05	600	UCC-045	P688-05	DF-503	PTE6S5		PT615	6TM-S5	Note 1
C123	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C124	.05	600	UCC-045	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C125	.05	600	UCC-045	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C126	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C127	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C128	.05	600	UCC-045	P688-05	DF-503	PTE6S5		PT615	6TM-S5	

Note 1. Not used in all Models.
Note 2. Some Models use 5000MMF in this application (Part #RCW-3014)
Note 3. Used on console model only.
◆ Items C87A, C87B, C87C, R82A, R82B, R82C are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA General Electric PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	3000Ω	2	RRC-192	QJ-398 *	RTV-377		WF33	Contrast - Wire Wound -Panel
B	500KΩ	½					UR55A	Volume - Rear- Note 1
C	Switch						US-26	Attach to R1B
R2A	100KΩ	½	RRC-191	QU-128	AG-49-S	AB-40	U-41	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
R3A	125KΩ	½	RRC-193	QU-228	AG-49-S		U-415	Vert. Hold.
B	Shaft		Not Req.	Not Req.	KSS-3		Not Req.	Attach to R3A
R4A	100KΩ	½	RRC-191	QU-128	AG-49-S	AB-40	U-41	Brightness
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R4A
R5A	2000Ω	2	RRC-095	W-2000	A43-2000	VK-131	N2500L	Vert. Linearity-Wire Wound
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R5A
R6A	4Meg	½	RRC-190	QU-141	AG-85-S	AB-86	SU-87	Vert. Size
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	2Meg	½	RRC-194		AM-83-S		U-56	AGC
B	Shaft		Not Req.		KSS-3		Not Req.	Attach to R7A
C	Switch		Not Req.		SWA-5		US-28 †	Attach to R7A

* CONCENTRIKIT EQUIVALENT -KIT K-3, BASE ELEMENTS & SHAFTS W11-112 & P3-210 (Panel) B13-133 & R2-306 (Rear) & SWITCH 76-1.

Note 1. In console models this control is tapped.
† Only use 1/2 of Sw. which activates control at extreme clockwise position.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA General Electric PART No.	IRC PART No.	NOTES
R8	3.3Meg	½	URD-133	BTS-3.3Meg	
R9	3.3Meg	½	URD-133	BTS-3.3Meg	
R10	120Ω	½		BTS-120	
R11	18KΩ	½			
R12	18KΩ	½			
R13	5600Ω	1			
R14	680Ω	½		BTS-680	
R15	1200Ω	½		BTS-1200	
R16	10KΩ	½			
R17	12KΩ	½			
R18	1000Ω	½		BTS-1000	
R19	5600Ω	½		BTS-5600	
R20	10KΩ	½			
R21	220KΩ	½		BTS-220K	
R22	1000Ω	½		BTS-1000	
R23	8200Ω	½		BTS-8200	
R24	3300Ω	½		BTS-3300	
R25	2200Ω	½		BTS-2200	
R26	1Meg	½	URD-121	BTS-1Meg	
R27	2.2Meg	½	URD-129	BTS-2.2Meg	
R28	1000Ω	½	URD-049	BTS-1000	Note 1
R29	47Ω 5%	½	URD-1017		
R30	1000Ω	½	URD-049	BTS-1000	
R31	5600Ω 5%	½	URD-1067		
R32	47Ω 5%	½	URD-1017		
R33	1000Ω	½	URD-049	BTS-1000	
R34	20KΩ 5%	½	URD-1080		
R35	180Ω	½	URD-031	BTS-180	
R36	18KΩ	½	URD-079		
R37	4700Ω	1	URE-065	BTA-4700	
R38	10KΩ	½	URD-073	BTS-10K	
R39	10KΩ	½	URD-073	BTS-10K	
R40	3900Ω 5%	½	URD-1063	BTS-3900 5%	
R41	33KΩ	½	URD-085	BTS-33K	
R42	1Meg	½	URD-121	BTS-1Meg	
R43	33KΩ	2	URF-085	BTB-33K	
R44	1500Ω	½		BTS-1500	
R45	22KΩ	2	URF-081	BTB-22K	
R46	22KΩ	2	URF-081	BTS-22K	
R47	68000Ω	2	URF-069	BTB-68000	
R48	1Meg	½	URD-121	BTS-1Meg	
R49	270KΩ	½		BTS-270K	
R50	100KΩ	½	URD-097	BTS-100K	
R51	3.3Meg	½	URD-133	BTS-3.3Meg	
R52	2.2Meg	½	URD-129	BTS-2.2Meg	
R53	180Ω	½	URD-031	BTS-180	
R54	18KΩ	½	URD-079		
R55	4700Ω	1	URE-065	BTA-4700	
R56	100KΩ 5%	½		BTS-100K 5%	
R57	47KΩ	½	URD-089	BTS-47K	
R58	470KΩ	½	URD-113	BTS-470K	
R59	27KΩ	½	URD-083	BTS-27K	
R60	100KΩ 5%	½		BTS-100K 5%	
R61	47KΩ	½	URD-089	BTS-47K	
R62	27KΩ	½	URD-083	BTS-27K	
R63	33KΩ	½	URD-085	BTS- 33K	
R64	6.8Meg	½	URD-141	BTS-6.8Meg	
R65	470KΩ	½	URD-113	BTS-470K	
R66	470KΩ	½	URD-113	BTS-470K	
R67	1000Ω	½	URD-049		
R68	220Ω	½		BTA-220	
R69	47Ω	½	URD-017		
R70	470Ω	2	URF-041	BTB-470	
R71	470KΩ	½	URD-113	BTS-470K	
R72	1Meg	½	URD-121	BTS-1Meg	
R73	150KΩ	½	URD-101	BTS-150K	
R74	22KΩ	1		BTA-22K	
R75	2.2Meg	½	URD-129	BTS-2.2Meg	
R76	15KΩ	½	URD-077	BTS-15K	
R77	470KΩ	½	URD-113	BTS-470K	
R78	470KΩ	½	URD-113	BTS-470K	
R79	22KΩ	½	URD-081	BTS-22K	
R80	180KΩ	½	URD-103	BTS-180K	
R81	10KΩ	½	URD-073	BTS-10K	
R82A	22KΩ ▲			BTS-22K	
B	8200Ω	½	◆REK-001	BTS-8200 *	
C	8200Ω	½		BTS-8200	
R83	47KΩ	2	URF-089	BTB-47K	
R84	68KΩ	½	URD-093	BTS-68K	
R85	3.3Meg	½	URD-133	BTS- 3.3Meg	
R86	1Meg	½	URD-121	BTS-1Meg	
R87	3.3Meg	½	URD-133	BTS-3.3Meg	
R88	470Ω	2	URF-041	BTB-470	
R89	82KΩ	½	URD-095	BTS-82K	
R90	470Ω	2	URF-041	BTB-470	
R91	22KΩ	½	URD-081	BTS-22K	
R92	15KΩ	½	URD-077	BTS-15K	
R93	33KΩ	½	URD-085	BTS-33K	
R94	1Meg	½	URD-121	BTS-1Meg	
R95	1.5Meg	½	URD-125	BTS-1.5Meg	
R96	560KΩ	½	URD-115	BTS-560K	
R97	100KΩ 5%	½		BTS-100K 5%	
R98	120KΩ	½	URD-099	BTS-120K	
R99	68KΩ	½	URD-093	BTS-68K	
R100	1Meg	½	URD-121	BTS-1Meg	
R101	33KΩ	½	URD-085	BTS-33K	
R102	220KΩ	½	URD-105	BTS-220K	
R103	68KΩ	½	URD-093	BTS-68K	
R104	27KΩ	½	URD-083	BTS-27K	
R105	68KΩ	½	URD-093	BTS-68K	
R106	33KΩ	1	URE-085	BTA-33K	
R107	10KΩ	½	URD-073	BTS-10K	
R108	68000Ω		URD-069	BTS-6800	
R109	100KΩ 5%	½		BTS-100K 5%	
R110	1Meg	½	URD-121	BTS-1Meg	
R111	33KΩ	½	URD-085	BTS-33K	
R112	330Ω	½	URD-037		
R113	470KΩ	½	URD-113	BTS-470K	
R114	100Ω	½	URD-049		
R115	15KΩ	1		BTA-15K	
R116	330Ω	1		BTA-330	Note 2
R117	31Ω	*	RRW-097		
R118	4.6Ω	5	RRW-048		
R119	1200Ω	1	URE-051	BTA-1200	
R120	30000Ω	10	RRW-095	1-3/4A-3000	
R121	5600Ω	5	RRW-079	1-3/4A-6000	
R122	470KΩ	½	URD-113	BTS-470K	
R123	470KΩ	½	URD-113	BTS-470K	
R124	150Ω	5		1-3/4A-150	

Note 1. Some Models use a 20KΩ resistor in this application.
Note 2. Not used in all Models.
◆ Items R82A, R82B, R82C, C87A, C87B, C87C are combined in one unit.
* Special Globar resistor.

TRANSFORMER (FILAMENT)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA General Electric PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC	② 6.3VAC .36A	② 5.2A		RTF-003			FO-66 ①	F-18X ①

①Drill one new mounting hole.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA General Electric PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	170Ω tap ②710,330 44Ω	0Ω SEC. 2 0Ω SEC. 3 0Ω	RTO-126 ①					Horiz. Output Trans.
T3	210Ω tap ②10Ω		RTO-121					Vert. Output Trans.
T4A	(210Ω & 210Ω)		RLD-042					Horiz. Deflection Coils
B	70Ω							Vert. Deflection Coils

① Alternate Horiz. Output Trans.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA General Electric PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T5	5.3KΩ	4Ω	610Ω	.48Ω	RTO-124	A-3877	A-2930	RO-9 ①	S-5X ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA General Electric PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	8"	PM	4Ω	8527D-7	ST-115 Mod. P8-V	8A21	

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA General Electric PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.300ADC	47.5Ω	.86 Hy.	RLF-056	C-2328 ①			

① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA General Electric PART No.	MERIT PART No.	IRC PART No.	NOTES
L2	Ant. Trans.	.2Ω CT	.1Ω				
L3	RF Choke	0Ω					
L4	Ant. Coil	0Ω					
L5	Ant. Coil	0Ω					
L6	IF Trap	.1Ω					
L7	1st.RF Plate Coil	0Ω					Channel 13
L8	1st.RF Plate Coils	0Ω					
L9	RF Coil	0Ω					
L10	2nd.RF Grid Coils	0Ω					Channel 13
L11	2nd.RF Grid Coil	0Ω					
L12	Fil. Choke	.1Ω					
L13	2nd.RF Plate Coil	0Ω					Channel 13
L14	2nd.RF Plate Coils	0Ω					
L15	Fil. Choke	.31Ω				CLA	.56 Microhenry
L16	Osc. Coils	0Ω					Includes trap
L17	Osc. Coil	0Ω					Channel 13
L18	Cathode Choke	.3Ω					Includes core, core part No. RE1-037
L19	RF Choke	3Ω				CLA	3.3 Microhenries
L20	RF Choke	3Ω				CLA	3.3 Microhenries
L21	RF Choke	3Ω				CLA	3.3 Microhenries
L22	Conv. Plate	.1Ω	0Ω				Includes 1KΩ resistor
L23	1st. Video IF	0Ω	.1Ω	RTL-138			Includes trap
L24	38MC Trap	0Ω		RLI-179			Includes core, core part No. RE1-037
L25	Fil. Choke	1.8Ω		RLI-122		CLA	2.2 Microhenries
L26	2nd. Video IF	.1Ω		RLP-020			Includes trap
L27	Fil. Choke	.2Ω		RLI-142			1.4 Microhenries
L28	3rd. Video IF	.1Ω		RLP-021			Includes trap
L29	RF Choke	8.2Ω		RLI-138		CL-1	10 Microhenries
L30	Shunt Peaking Coil	7.5Ω		RLI-184	TV-185		265 Microhenries
L31	Series Peaking Coil	5.5Ω		RLI-176	TV-184 *		120 Microhenries, wound 15KΩ resistor
L32	Series Peaking Coil	6Ω		RLI-175	TV-184 ■		120 Microhenries, wound 3.9KΩ resistor
L33	4.5mC Trap	.8Ω		RLI-181	TV-151		
L34	Shunt Peaking Coil	10.5Ω		RLI-154	TV-188		425 Microhenries
L35	Series Peaking Coil	7Ω		RLI-183	TV-184 †		165 Microhenries, wound on 8.2KΩ resistor
L36	1st.Sound IF	2.6Ω		RLI-182	TV-151		27 Microhenries
L37	Fil. Choke	1.8Ω		RLI-122		CLA	2.2 Microhenries
L38	2nd.Sound IF	4.6Ω	4.4Ω	RLI-180	TV-108		
L39	Fil. Choke	1.8Ω		RLI-122		CLA	2.2 Microhenries
L40	Ratio Det.	3.6Ω	.6Ω CT	RTD-012	TV-115 ▲		
L41	RF Choke	3Ω				CLA	3.3 Microhenries
L42	RF Choke	8.2Ω		RLI-138		CL-1	10 Microhenries
L43	Horiz. Osc.	120Ω		RLC-091			Tapped ② 85Ω
L44	Width Coil	44Ω		RLD-046			
L45	RF Choke	19Ω		RLI-177			30 Microhenries
L46	RF Choke	8.2Ω		RLI-138		CL-1	10 Microhenries
L47	Horiz. Lin.	30Ω		RLD-044	MWC-3		

* Parallel with 15KΩ resistor
■ Paralle with 3.9KΩ resistor
† Parallel with 8.2KΩ resistor
▲ Use mounting plate, add 270Ω series resistor

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA General Electric PART No.	SYLVANIA PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.
M1	.300A	RER-014	NL5	6Q84	1206A	68350	350
M2	.300A	RER-014	NL5	6Q84	1206A	68350	350

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA General Electric PART No. FUSE	GE HOLDER	LITTELFUSE PART No. FUSE	LF HOLDER	BUSS PART No. FUSE	BUSS HOLDER
M3	3AG (Slo-Blo P/T)	1-6/10A 125V	REF-008		31501.6 (3AG-1-6/10A Slo-Blo P/T)		MDV - 1-6/10	

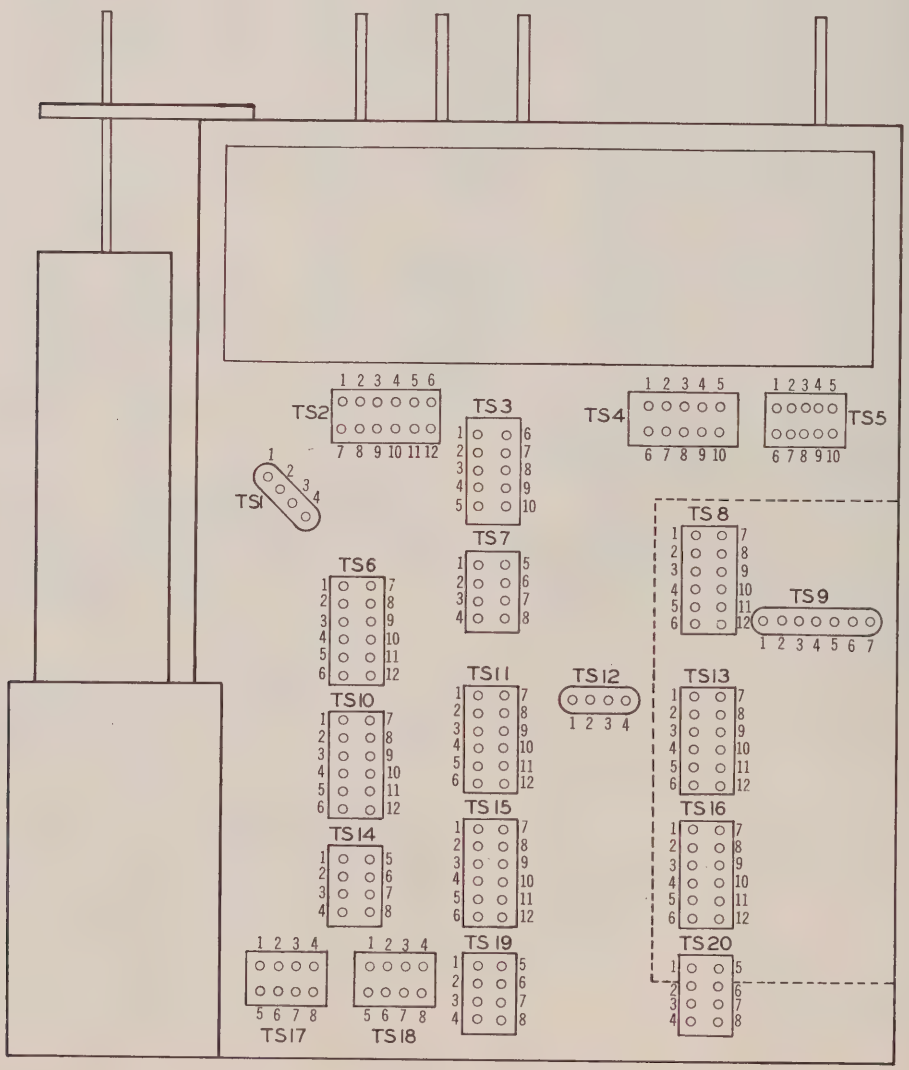
DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA General Electric PART No.		NOTES
M4	Bayonet	6-8	.15	Brown	47		Type #47

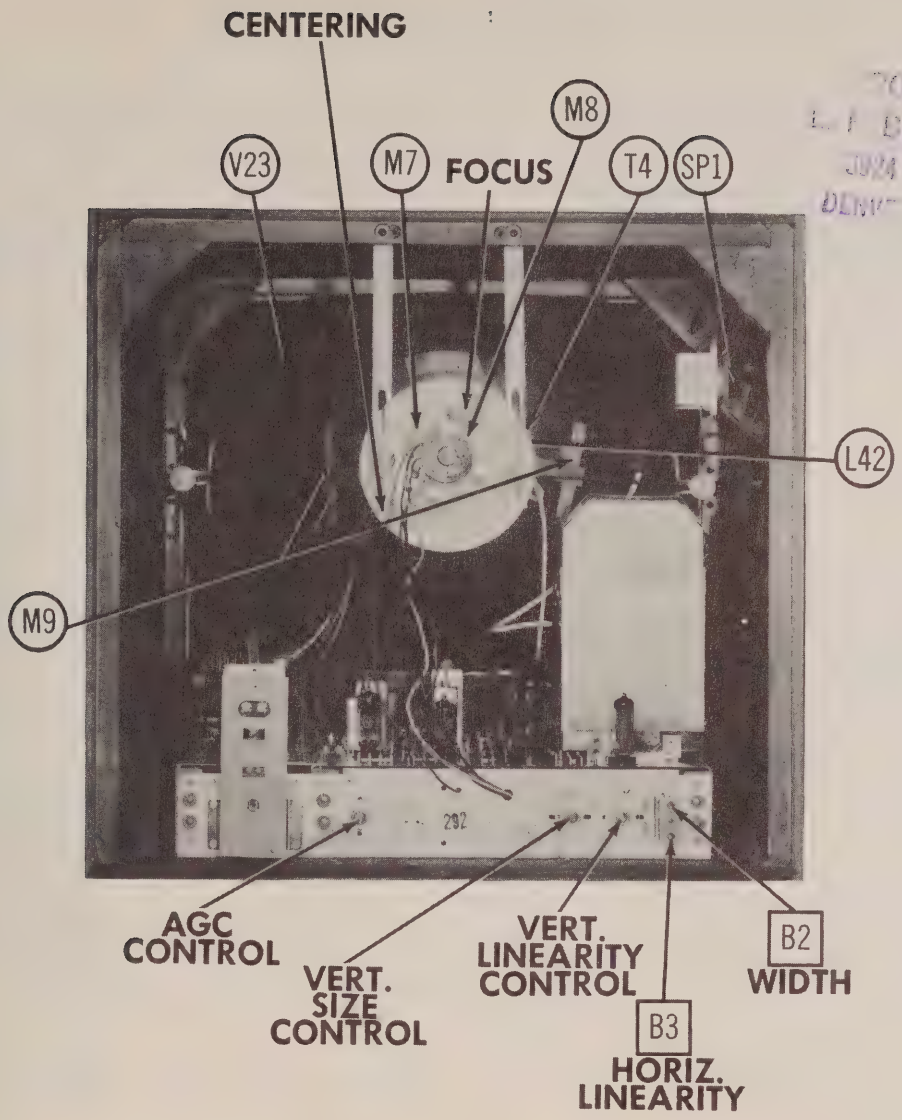
PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	General Electric PART No.	NOTES
M5	RF Tuner	RJX-049	
M6	4th. Video IF		
	Capacitor	UCG-1005	Silver Mica, 5MMF
	Capacitor		5MMF
	Capacitor	UCG-2026	Silver Mica, 82MMF
	RF Choke	RLF-024	31 Microhenries
	Peaking Coil	RLI-142	1.4 Microhenries
	Crystal Diode	1N64	Video Detector Assy. Part #RLX-036
M7	Focus Magnet	RLF-055	Includes Centering Device
M8	Ion Trap	RET-013	
M9	Magnet		Pin Cushion Correction (2 Used, right and left)
	Cabinet	RAV-206	Model 21T1 (Early)
	Cabinet	RAV-200	Mahogany Model 21T1 (Late)
	Cabinet	RAV-199	Mahogany Model 21C201
	Cabinet	RAV-201	Blonde, Model 21C202
	Cabinet	RAV-198	Mahogany, Model 21C204 and 21C214
	Cabinet	RAV-202	Black Cherry, Model 21C206
	Cabinet	RAV-203	Mahogany, Model 21C208
	Safety Glass	RDW-060	Model 21T1 (Early)
	Safety Glass	RDW-061	Model 21T1 (Late) Models 21C204 and 21C208
	Safety Glass	RDW-063	Models 21C201, 21C202, 21C206 and 21C214
	Mask	RDM-031	Model 21T1 (Early)
	Mask	RDM-032	Model 21T1 (Late), Models 21C204 and 21C208
	Mask	RDM-034	Models 21C201 and 21C214
	Mask	RDM-035	Model 21C202
	Mask	RDM-036	Model 21C206
	Escutcheon (Door)	RDE-139	
	Knob Plate Assy.	RDE-138	Models 21T1, 21C201 and 21C204
	Knob Plate Assy.	RDE-140	Models 21C202, 21C206, 21C208 and 21C214
	Knob	RDK-286	Channel Selector
	Knob	RDK-287	Fine Tuning
	Knob	RDK-288	Off/On Volume
	Knob	RDK-289	Contrast
	Knob	RDK-290	Vert. Hold, Horiz. Hold, Brightness (3 used), also picture stabilizer, 21T1 (Early)
	Knob	RDK-291	AGC, 21T1 (Late), 21C201, 21C202, 21C204, 21C206, 21C208 and 21C214



TERMINAL STRIP LOCATION CHART



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control at mid-position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

PICTURE STABILIZER CONTROL

The picture stabilizer control should be adjusted so that the strongest signal received does not cause overloading of the picture. In weak signal areas the extreme clockwise "switch" position of the control is used to improve sync stability in the presence of ignition and similar types of interference.

ANTI-PINCUSHION MAGNETS

Reduce the picture size so that the sides of the raster are visible and position the magnets so that all sides are straight lines and the corners are right angles.

It may be necessary to readjust the width.

CIRCUIT DESCRIPTION

A noise cancellation circuit is employed in this receiver to aid in providing noise free sync pulses for application to the horizontal phase detector and vertical oscillator circuits. If this noise cancellation circuit is inoperative, intermittent sync and/or faulty AGC action may occur.
The cancellation is accomplished by coupling the same negative going signal into the grid of the sync amplifier and the cathode of the noise inverter, each having a common plate load. The resulting signals are 180 degrees out of phase and thus cancel.
The noise inverter is so biased, by a voltage dividing network and grid leak action, that it conducts only on noise pulses of amplitude greater than the amplitude of the sync pulses.

The grid leak voltage developed by the noise inverter is tapped off and filtered for use as AGC voltage for both RF and IF stages.
The malfunction of the noise inverter could result in faulty AGC action. Illustrated by signal overload and weak or no sync.
Vertical and horizontal retrace blanking is employed in this receiver. The horizontal retrace blanking circuit consists of a cathode follower stage, whose function is to isolate the horizontal output from any loading. A portion of the horizontal sweep signal is coupled into the grid circuit of the cathode follower which controls the conduction of the tube. The output is taken off across the cathode load resistance and applied to the picture tube cathode. The vertical retrace blanking signal is also fed to the cathode of the picture tube.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Substitute V16, V17 and V18. Check signal at W17.

If Unsatisfactory	If Satisfactory
Check for signal at plate of V16B. If missing or weak, check V17 for proper operation. Check coupling circuit between horizontal oscillator and horizontal discharge tubes.	Substitute V20. Check T2 and associated components. Substitute yoke.

INSUFFICIENT SWEEP

Substitute V16, V18 and V19. Check amplitude of signal at W17.

If Unsatisfactory	If Satisfactory
Check components of horizontal oscillator V17 and horizontal discharge V16B.	Check T2, L44 and C119.

DRIVE LINES

Substitute V19 and V18. Check signal at W17.

If Unsatisfactory	If Satisfactory
Check coupling and shaping network between V16B and V18.	Check T2 and associated components.

COMPRESSED AT LEFT SIDE

Substitute V18 and V19. Check waveform W17.

If Unsatisfactory	If Satisfactory
Check coupling and shaping network between V16B and V18.	Check T2.

FOLDS

Substitute V19. Check C119 and other components of the horizontal output and damper circuit.

VERTICAL

LOSS OF SWEEP

Substitute V14 and V15. Check signal at W9.

If Unsatisfactory	If Satisfactory
Check components associated with V14. Check coupling circuit between V14 and V15.	Check T3 and R90. Check yoke.

INSUFFICIENT SWEEP

If adjustment of both height and vertical linearity controls fails to give sufficient height, substitute V14 and V15.
Check Boost B plus.

If Unsatisfactory	If Satisfactory
Substitute V18 and V19.	Check T3 and R90.

COMPRESSED AT TOP

Substitute V14. Check signal at W9.

If Unsatisfactory	If Satisfactory
Check components of V14 and coupling between V14 and V15.	Check T3 and yoke.

COMPRESSED AT BOTTOM

Substitute V15. Check C36, T3 and C4B.

FOLDS

If adjustment of height and vertical linearity controls and substitution of V15 fail to correct folds in picture, check T3 and associated components. Check yoke.

SYNC

HORIZONTAL

LOSS OF SYNC

Substitute V12, V13, V16 and V17. Check L43 and components associated with V16A and V17.

CRITICAL HOLD

Substitute V12, V13, V16 and V17.
Check feedback network formed by R107, R108, C111 and C112 for loss on attenuation of signal.
Check R103 for change of value.

VERTICAL

LOSS OF SYNC

Substitute V13 and V14. Check output from sync clipper for vertical sync pulses.

If Unsatisfactory	If Satisfactory
Trace signal back, stage by stage. Check components of faulty stage.	Check vertical integrating network and vertical oscillator circuit.

CRITICAL SYNC

Substitute V12, V13 and V14. Check signal at W7.

If Unsatisfactory	If Satisfactory
Check video detector, video amplifier and video IF for overloading.	Check coupling network between video detector and the sync amplifier.

TRIGGERING

Substitute V14. Check associated circuit components.

TROUBLE SHOOTING AIDS (CONT.)

VIDEO

SOUND BARS

Check adjustment of 4.5MC trap in video amplifier circuit. Check local oscillator adjustment and video IF alignment.

POOR RESOLUTION

Check alignment of video. If alignment can not be brought within tolerance, substitute video IF tubes and check circuit components.

SMEAR

Check R43 and R47 for change of value. Check L33 and L35 for open. Check signal on both sides of C54 and C58 to determine if coupling circuits are distorting signal. Check video detector and IF for overloading.

ONE WIDE BLACK BAR

Check tuner, Video IF, Video detector and Video amplifier tubes for filament to cathode leakage.

POOR CONTRAST

Check amplitude of signal at W1.

If Unsatisfactory	If Satisfactory
Substitute V4, V5 and V6. Substitute video detector (1N64- located in M6). Check alignment of video IF.	Check waveform W3.

Check waveform W 3.

If Unsatisfactory	If Satisfactory
Check video amplifier circuit and coupling to picture tube.	Check picture tube.

AUDIO

WEAK OR NO SOUND

Substitute V8, V9, V10 and V11. Check alignment of ratio detector and Sound IF stages. Check video IF alignment.

BUZZ

Adjust ratio detector secondary for minimum buzz. If still noticeable, substitute V10 and readjust.

DISTORTED

Check audio amplifier stages V10B and V11 using audio signal generator.

If Undistorted	If Distorted
Check adjustment of ratio detector and sound IF stages. Check video IF alignment.	Check components of amplifier stage where distortion occurs.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check waveform at W17.

If Unsatisfactory	If Satisfactory
Substitute V16, V17 and V18. Check associated circuit components.	Substitute V19, V20, V21 and V22. Check T2.

WEAK HIGH VOLTAGE

If substitution of horizontal oscillator, horizontal output, damper and high voltage rectifier tubes fail to correct this trouble, check waveform at W17.

If Unsatisfactory	If Satisfactory
Check coupling network between V16B and V18.	Check T2 and associated components.

BLOOMING

Substitute V20, V21 and V22. Check high voltage filter and tripling capacitors. Check picture tube.

POWER

SMALL RASTER, WEAK SOUND

Check B plus circuits for shorts. If no shorts are present and B plus is low, substitute selenium rectifiers M1 and M2.

DIM PICTURE

Measure B plus.

If Low	If Normal
Check for shorts. If none are present, substitute M1 and M2.	Check C118 and components of boost B plus circuit.

GENERAL

NO SOUND, NO PICTURE, NO SNOW

Substitute V3 and check AGC for proper voltage.

SNOW, BUT NO PICTURE OR SOUND

Substitute V1 and V2. Check tuner output for signal.

If Signal is Absent	If Signal is Present
Check tuner and tuner load.	Check video IF tubes and components.

SNOWY PICTURE, GOOD SOUND (In strong signal areas)

Substitute V1 and V2. Check video IF for weak tube. Check video IF components.

INTERMITTENT STREAKS

Check high voltage circuit for corona discharge and arcing. This may best be done in a darkened room.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the channel selector shaft.

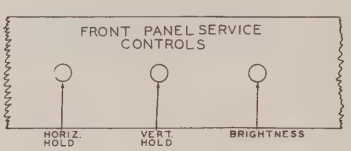
PICTURE TUBE SAFETY GLASS CLEANING

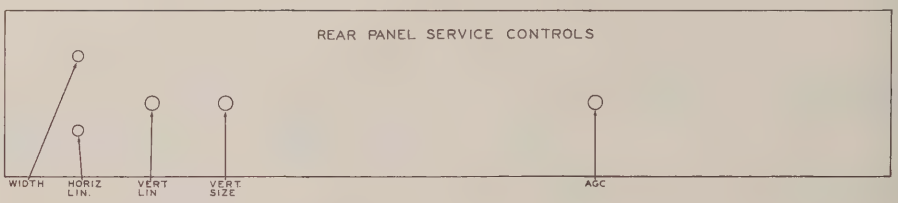
For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION





HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For the adjustment of the Horiz. oscillator slug, it is necessary to remove the rear cover, and supply power to set with a cheater cord. Adjustment is located on top of chassis. (See tube placement chart).

BUZZ ADJUSTMENT

For adjustment of Ratio Det. secondary (L40) to eliminate 4.5MC buzz. Remove panel from bottom of cabinet. (For location see tube placement chart).

FUSES

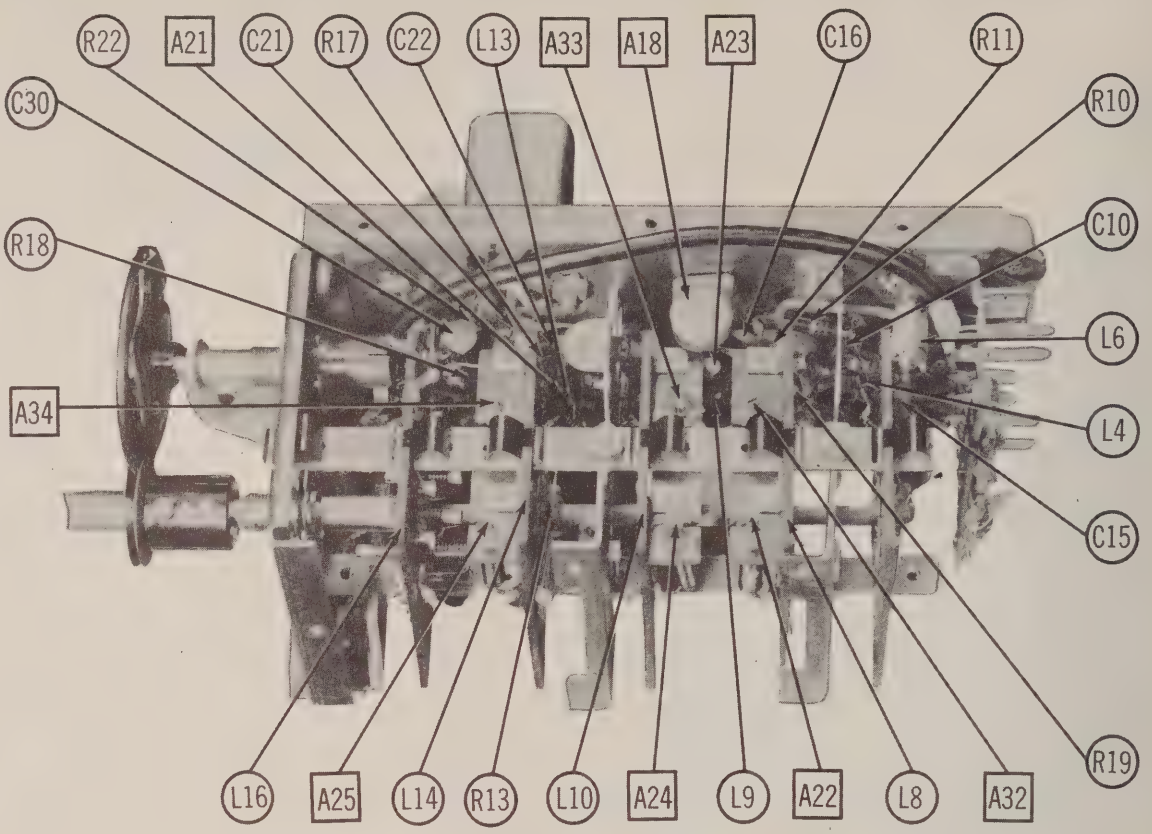
One fuse is used for power supply protection, (For location see tube placement chart.)

CENTERING

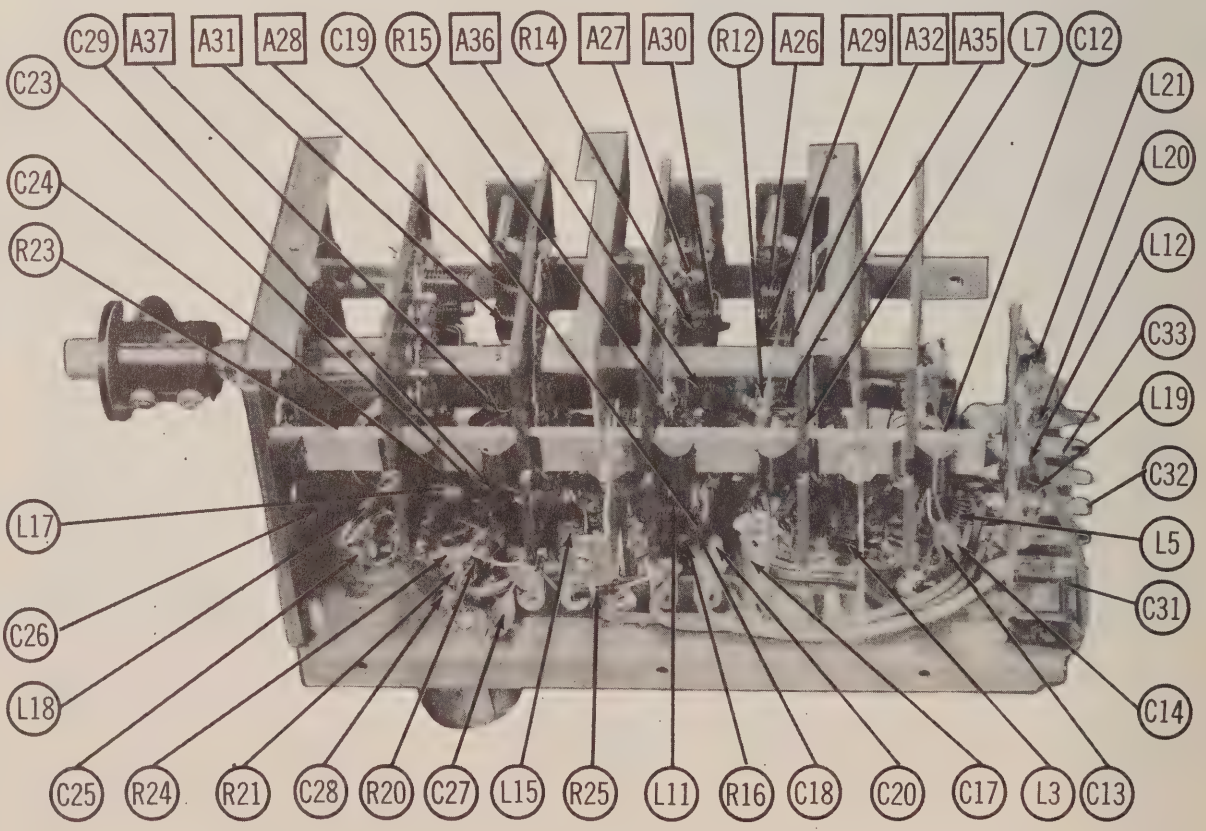
To center picture loosen two screws holding centering lever. Move centering lever in a circular path until picture is properly centered. (For location see cabinet - rear view).

DISASSEMBLY INSTRUCTIONS

1. Chassis Disassembly
   a. Remove 7 push-on type control knobs from front panel.
   b. Disconnect built-in antenna. Remove 8 wood screws. Remove rear cover.
   c. Disconnect yoke plug, speaker, CRT socket, HV lead and horiz. sweep coupling.
   d. Remove 4 chassis bolts. Remove chassis.
   e. Remove 4 speaker nuts. Remove speaker.
2. Picture Tube Removal
   a. Removal of chassis is necessary.
3. Picture Tube Cleaning
   a. Removal of chassis is necessary.

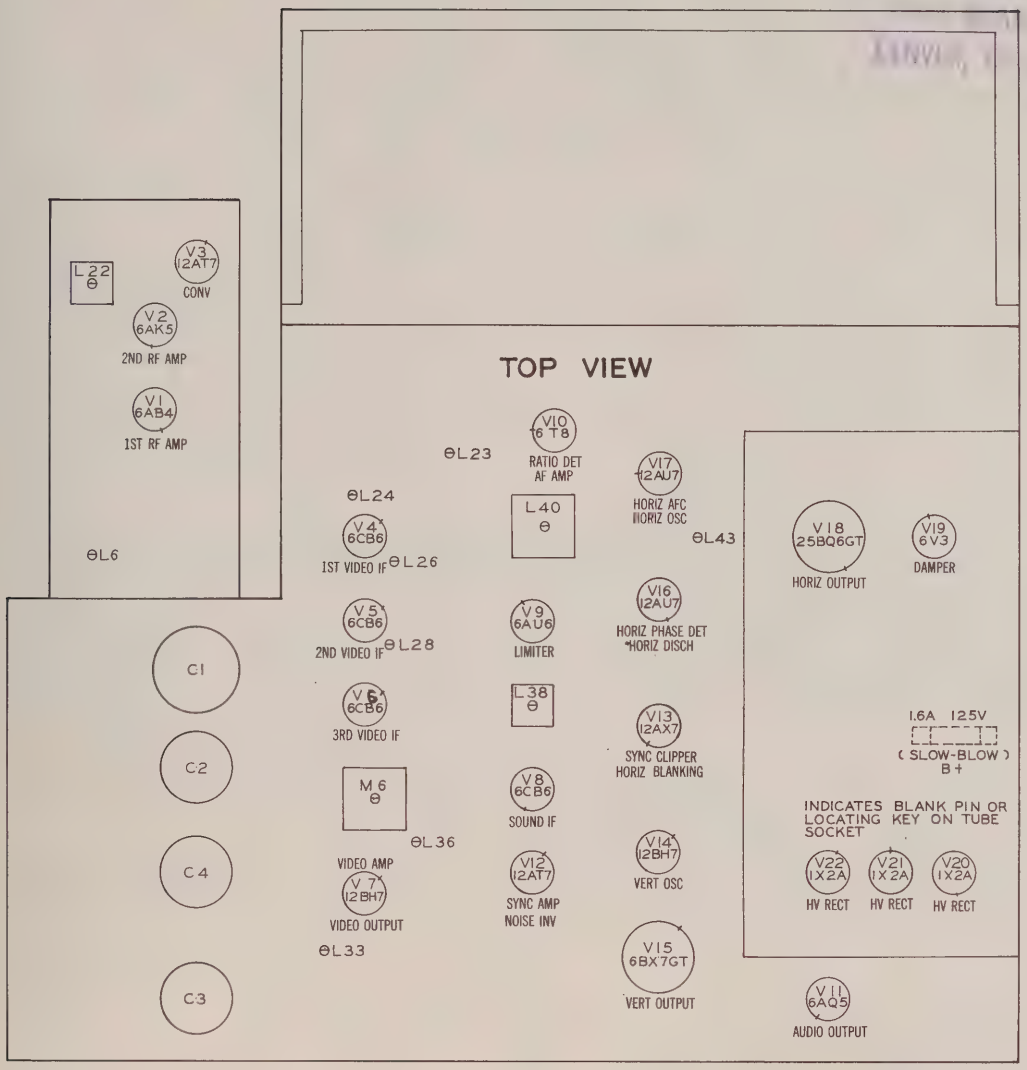


RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for lacation and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1, M2), fuse (M3)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3, V4
No pic, has sound, has raster - V7, V23
Has pic, no sound - V8, V9, V10, V11
Overloaded picture - V12

SYNC FAILURE
No vert. sync - V13, V14
No horiz. Sync - V13, V16, V17
No vert. or horiz. sync - V12, V13,

SWEEP FAILURE
No raster, has sound - V16, V17, V18, V19, V20, V21, V22, V23
No vertical deflection - V14, V15
Poor vert. linearity or foldover - V14, V15
Poor horiz. linearity or foldover - V16, V17, V18, V19
Narrow picture - V16, V17, V18, V19, V20, V21, V22, M1, M2
Vert. off freq. - V13, V14
Horiz. off freq. - V13, V16, V17

NOTE: Since this receiver employs tubes used in a series filament network, an open filament in any tube in series may cause the set to be inoperative.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal discharge tube (V16) from its socket. Short across pin 5 to 9 of V16 socket to maintain continuity in the filament string.
Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Connect a 100KΩ, ½ watt resistor across R75 during alignment to cutoff the noise inverter section of V12 and prevent it from distorting the response curve.
Connect the negative lead of a 3 volt bias battery to the ungrounded side of C38.
Connect the positive lead to chassis.
Tune receiver to channel where rotation of fine tuning control does not change shape of response curve.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 6CB6 (V6). Low side to chassis.	44MC (15MC Swp)	38.0MC 44.6MC	Any non-interfering channel	Vert. Amp. to point (A). Low side to chassis.	A1, A2	Adjust A1 for MINIMUM response at 38.0MC. Adjust A2 for maximum response at 44.6MC.
2.	"	High side to point B. Low side to chassis.	44MC (10MC Swp)	41.25MC	"	"	A3	Adjust for MINIMUM marker response.
3.	"	"	"	47.25MC	"	"	A4	"
4.	"	"	"	45.75MC 42.5MC	"	"	A5, A6 A2	Adjust for response similar to Fig. 1 with markers as shown. A5 affects 45.75MC placement. A6 affects 42.5MC placement, and A2 flattens peak of curve.
5.	"	High side to point C. Low side to chassis.	"	38.0MC	"	"	A7	Adjust for MINIMUM marker response.
6.	"	"	"	47.25MC	"	"	A8	"
7.	"	"	"	38.0MC 41.25MC 42.5MC 45.0MC 45.75MC 47.25MC	"	"	A9, A10	Adjust for maximum gain with response similar to Fig. 2. If necessary retouch A5 and A6 for desired response.

If tuner alignment is not intended perform steps 19 and 20 as a part of the Video IF Alignment.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (D) to chassis. The junction of these two resistor is alignment point (F) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel.	DC probe to point (D). Common to chassis.	A11, A12, A13, A14	Adjust for maximum deflection.
9.	"	"	"	"	DC probe to point (E). Common to point (F).	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any non-interfering channel	Vert. Amp. to point (D). Low side to chassis.	A11, A12, A13, A14	Disconnect stabilizer capacitor C6. Adjust for curve of maximum amplitude and symmetry as in Fig. 3.
9.	"	"	"	"	"	Vert. Amp. to point (E). Low side to chassis.	A15	Reconnect capacitor C6. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 4. SLIGHTLY retouch A14 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

Set contrast control at position for normal viewing.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.001MFD	High side to pin 2 (grid) of 12BH7 (V7). Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe thru detector (Fig. 5) to pin 2 of picture tube. Common to chassis.	A16	Adjust for MINIMUM deflection.

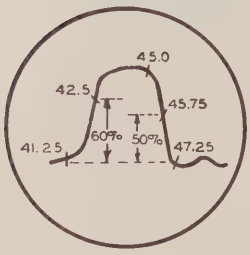


FIG.1

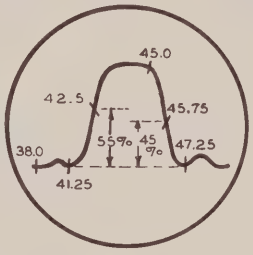


FIG.2

FIG. 3

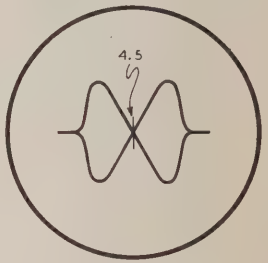


FIG. 4

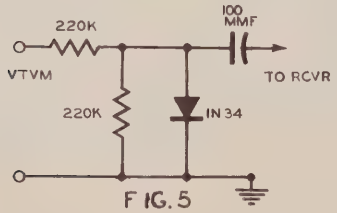


FIG. 5

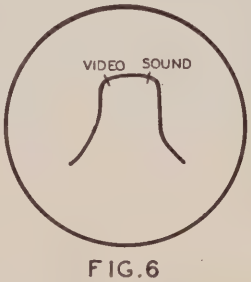


FIG.6

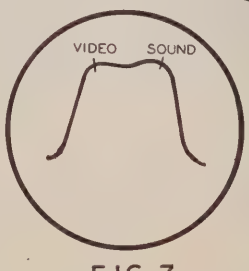


FIG. 7

ALIGNMENT INSTRUCTIONS (CONT.)

RF ALIGNMENT

Connect bias battery as under Video IF Alignment.
Disconnect the B+ lead to the oscillator section of V3.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (15MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (C). Low side to chassis.	A17, A18 A19, A20	Adjust for maximum gain and proper bandwidth as in Fig. 6. A18 affects the bandwidth.
12.	"	"	207MC (15MC Swp)	205.25MC 209.75MC	12	"	A21	Check tracking on high band channels and adjust circuit dress of A21 if necessary.
			201MC (15MC Swp)	199.25MC 203.75MC	11			
			195MC (15MC Swp)	193.25MC 197.75MC	10			
			189MC (15MC Swp)	187.25MC 191.75MC	9			
			183MC (15MC Swp)	181.25MC 185.75MC	8			
			177MC (15MC Swp)	175.25MC 179.75MC	7			
13.	"	"	85MC (15MC Swp)	83.25MC 87.75MC	6	"	A22, A23 A24, A25	Adjust for maximum gain and response curve similar to Fig. 7.
14.	"	"	79MC (15MC Swp)	77.25MC 81.75MC	5	"	A26, A27	If necessary compress or expand A26, A27, and A28 for proper tracking.
15.	"	"	69MC (15MC Swp)	67.25MC 71.75MC	4	"	A29, A30 A31	If necessary compress or expand A29, A30 and A31 for proper tracking.
16.	"	"	63MC (15MC Swp)	61.25MC 65.75MC	3	"	A32, A33 A34	Adjust for curve similar to Fig. 7.
17.	"	"	57MC (15MC Swp)	55.25MC 59.75MC	2	"	A35, A36 A37	If necessary compress or expand A35, A36, and A37 for proper tracking.

OSCILLATOR ALIGNMENT

Leave bias battery connected as under Video IF alignment.
Set the fine tuning control ½ turn from its extreme counter clockwise position for the entire oscillator alignment.
Reconnect the B+ lead to the oscillator section of V3.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
18.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (14MC Swp)	211.25MC	13	Vert. Amp. to point (A). Low side to chassis.	A38	Adjust to place marker at 50% on high frequency side of response curve.
			207MC (14MC Swp)	205.25MC	12		A39	
			201MC (14MC Swp)	199.25MC	11		A40	
			195MC (14MC Swp)	193.25MC	10		A41	
			189MC (14MC Swp)	187.25MC	9		A42	
			183MC (14MC Swp)	181.25MC	8		A43	
			177MC (14MC Swp)	175.25MC	7		A44	
			85MC (14MC Swp)	83.25MC	6		A45	
			79MC (14MC Swp)	77.25MC	5		A46	
			69MC (14MC Swp)	67.25MC	4		A47	
			63MC (14MC Swp)	61.25MC	3		A48	
			57MC (14MC Swp)	55.25MC	2		A49	

OVERALL TUNER AND VIDEO IF RESPONSE CHECK

Leave bias battery connected as under Video IF Alignment.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
19.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each Lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. to point (A). Low side to chassis.	A20	Adjust for zero tilt of response curve on Channel 12. Check other channels and if necessary, make compromise adjustment of A20 for not more than 20% tilt on any channel, with fine tuning adjusted for proper placement of markers.
			213MC (10MC Swp)	211.25MC 215.75MC	13			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 79.75 MC	7			
20.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	5	"	A25, A34	Adjust for zero tilt of response curve on channels 3 and 6. Check other low band channels and if necessary, make compromise adjustments of A25 and A34 for not more than 20% tilt on any channel, with fine tuning adjusted for proper placement of markers.
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

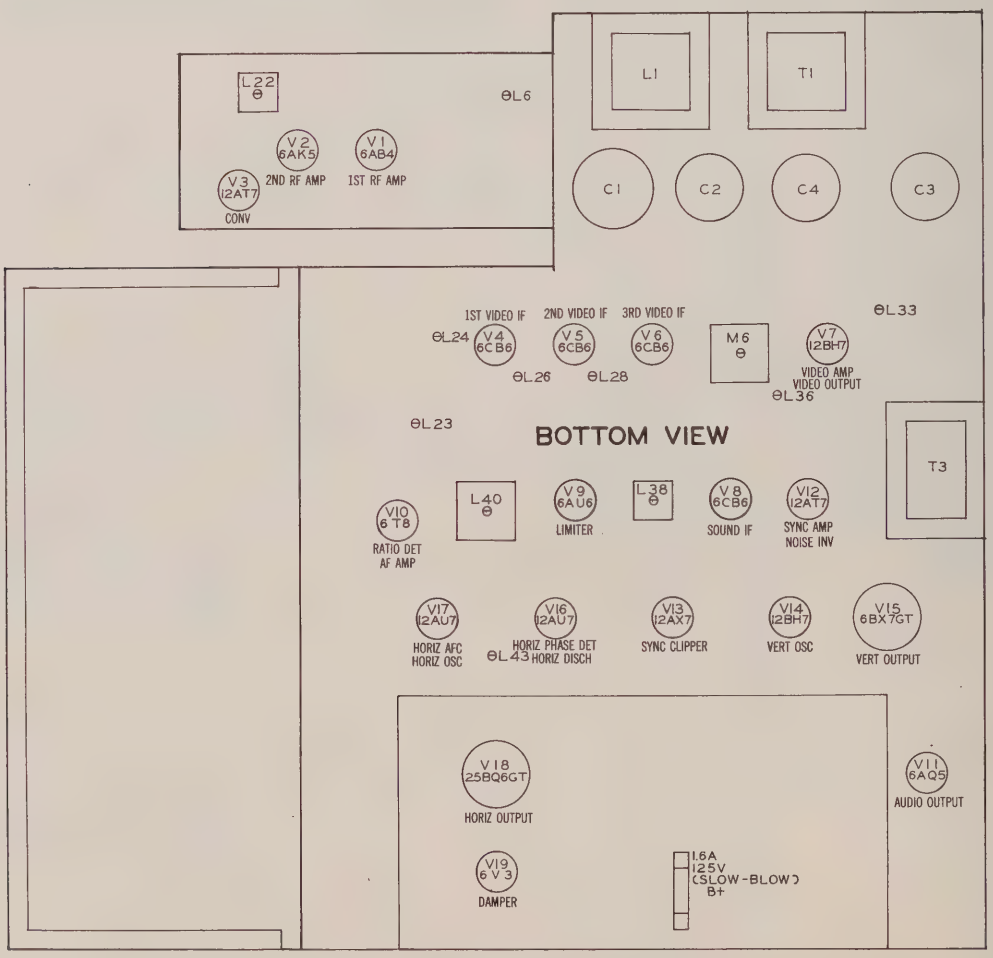
IF TRAP ADJUSTMENT

The IF trap, L6, is for the purpose of eliminating any interference in the IF range.
Tune to the channel on which interference is noted and adjust A50 for MINIMUM interference pattern on the screen.
Check to see that reception of Channel 2 has not been impaired.

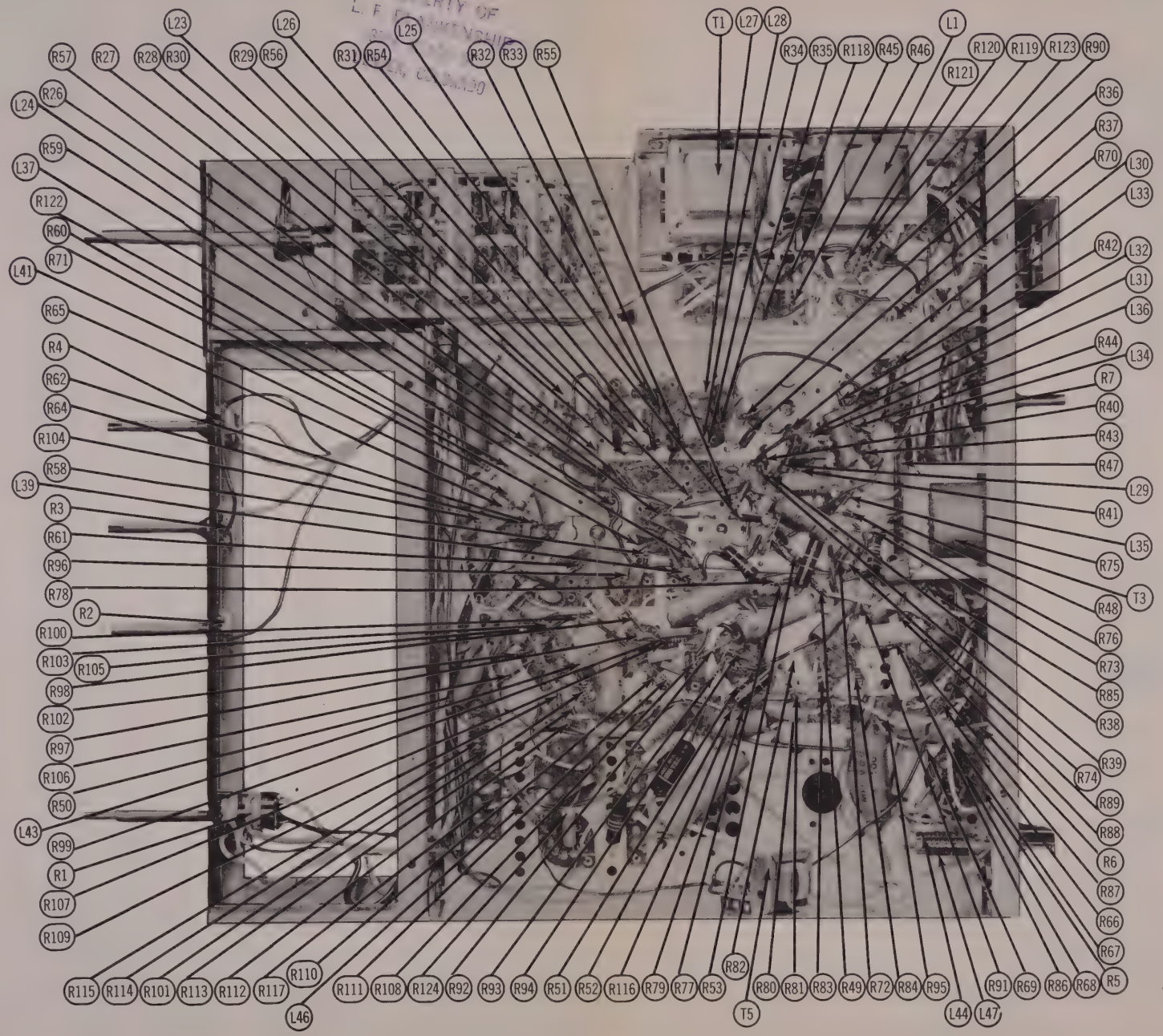
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AB4	†4.3KΩ	0Ω	.1Ω	0Ω	†30.5Ω	0Ω	120Ω		
V 2	6AK5	890KΩ	0Ω	0Ω	.1Ω	†6.6KΩ	†18KΩ	0Ω		
V 3	12AT7	†5.5KΩ	8.2KΩ	.2Ω	0Ω	0Ω	†6.6KΩ	230KΩ	0Ω	.1Ω
V 4	6CB6	1.1Meg	47Ω	15Ω	12.3Ω	†4KΩ	†4KΩ	0Ω		
V 5	6CB6	1.1Meg	47Ω	11Ω	8.3Ω	†4KΩ	†4KΩ	0Ω		
V 6	6CB6	20KΩ	180Ω	8.3Ω	5.8Ω	†4.7KΩ	†23KΩ	0Ω		
V 7	12BH7	10KΩ	1Meg	780Ω	5.8Ω	0Ω	†6.8KΩ	10KΩ	11KΩ	2.9Ω
V 8	6CB6	2.6Ω	180Ω	21.3Ω	20.2Ω	†4.7KΩ	†23KΩ	0Ω		
V 9	6AU6	47KΩ	0Ω	19Ω	17Ω	†27KΩ	83KΩ	0Ω		
V 10	6T8	INF	27KΩ	INF	.1Ω	0Ω	0Ω	0Ω	6.8Meg	†470KΩ
V 11	6AQ5	470KΩ	220Ω	0Ω	.1Ω	1.1KΩ	500Ω	470KΩ		
V 12	12AT7	†19KΩ	37KΩ	15KΩ	21.3Ω	21.3Ω	†19KΩ	1Meg	0Ω	25Ω
V 13	12AX7	†700Ω	2.8Meg	0Ω	30Ω	30Ω	#52Ω	1Meg	37KΩ	34Ω
V 14	12BH7	48KΩ	48KΩ	0Ω	30Ω	25Ω	#3Meg	120KΩ	0Ω	27Ω
V 15	6BX7GT	2.3Meg	†700Ω	1.1KΩ	2.3Meg	†700Ω	1.1KΩ	.1Ω	0Ω	
V 16	12AU7	†33KΩ	1Meg	0Ω	34Ω	34Ω	410KΩ	190KΩ	310KΩ	33Ω
V 17	12AU7	†65Ω	1.4Meg	0Ω	36Ω	36Ω	†34KΩ	63KΩ	55Ω	34Ω
V 18	25BQ6GT	INF	19Ω	INF	†16KΩ	470KΩ	INF	9.5Ω	150Ω	TOP CAP #30Ω
V 19	6V3	INF	†65Ω	INF	.1Ω	0Ω	INF	†65Ω	Pin 8 INF	Pin 9 †65Ω / Top Cap 3.8Meg
V 20	1X2A	PINS 1 - 9 HAVE INF RESISTANCE								TOP CAP #156Ω
V 21	1X2A	PINS 1 - 9 HAVE INF RESISTANCE								TOP CAP INF
V 22	1X2A	PINS 1 - 9 HAVE INF RESISTANCE								TOP CAP INF
V 23	21EP4A	.1Ω	1Meg	PIN 10 #2Meg	PIN 11 280KΩ	PIN 12 0Ω				

† MEASURED FROM OUTPUT OF M2
# MEASURED FROM TOP CAP OF V19.
LOCAL-DISTANT SWITCH IN LOCAL POSITION



TUBE PLACEMENT CHART



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

GROMMES
MODEL LJ-2

GROMMES
MODEL LJ-2

TRADE NAME	Grommes Model LJ-2
MANUFACTURER	Precision Electronics. Inc., Franklin Park, Ill.
TYPE SET	AC Operated 3 Channel Audio Amplifier
TUBES (Five)	Types 6SC7 Pre-Amp., 6SL7GT AF Amp.-Phase Inv., (2) 6V6GT Audio Output, 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING .62 Amp. @ 117 Volts AC

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	INSTALLATION NOTES
		GROMMES PART No.	STANDARD REPLACEMENT		
V1	Pre-Amplifier	6SC7	6SC7	8S	
V2	AF Amplifier-Phase Inverter	6SL7GT	6SL7GT	8BD	
V3	Audio Output	6V6GT	6V6GT	7S	
V4	Audio Output	6V6GT	6V6GT	7S	
V5	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	GROMMES PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	●40	400		AFH4-78		D064		FP428	TVL-4734	
B	■30	350								
C	▲10	300								
D	10	25								
C2	10	250		PRS250/12		BR1225A		TC52	TVA-1504	
C3	100	15		PRS15/100		BRH15IA		TC2501	TVA-1160	
C4	.05	400		P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C5	.003	600		P688-003	D6-302	PTE6D3	GP2-333-302	PT623	6TM-D3	
C6	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C7	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C8	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C9	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C10	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C11	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	

CONTROLS

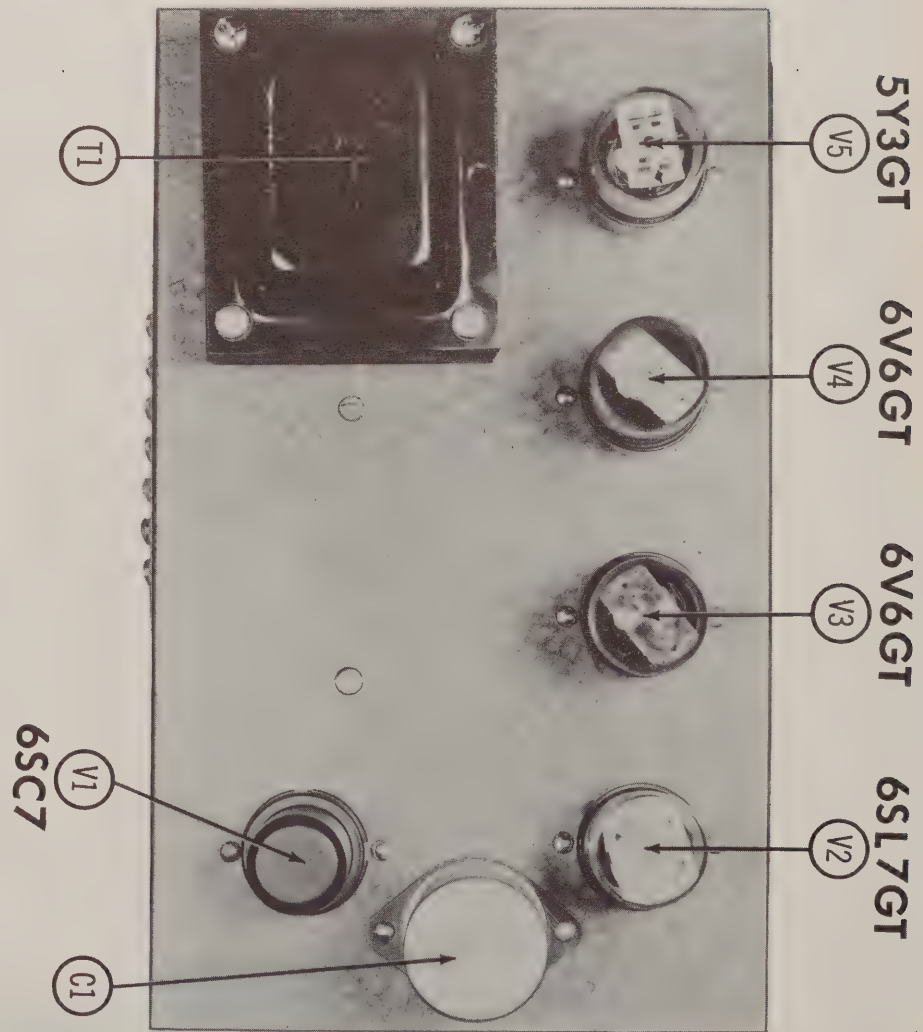
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	GROMMES PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	2 Meg	½		Q13-139X	AT-115	BT-80	UT-449	Volume-Tap @ 550KΩ
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	Attach to R1A
R2A	1.5Meg	½	W-3181	Q13-139X	AG-66-Z	B-76	U-55	Treble
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R2A
R3A	3 Meg	½		Q13-140	AG-67-Z	B-85-S	U-57	Bass
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	Attach to R3A
C	Switch			76-1	SWB	Not Req.	US-26	Attach to R3A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	GROMMES PART No.	IRC PART No.	
R4	47KΩ	½		BTS-47K	
R5	3.3Meg	½		BTS-3.3Meg	
R6	47KΩ	1		BTA-47K	
R7	100KΩ	½		BTS-100K	
R8	3.3Meg	½		BTS-3.3Meg	
R9	47KΩ	1		BTA-47K	
R10	27KΩ	½		BTS-27K	
R11	47KΩ	½		BTS-47K	
R12	470K	½		BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	GROMMES PART No.	IRC PART No.	
R13	100Ω	½		BTS-100	
R14	100KΩ	½		BTS-100K	
R15	470KΩ	½		BTS-470K	
R16	2200Ω	½		BTS-2200	
R17	390KΩ	½		BTS-390K	
R18	300Ω	5		1 3/4A300	
R19	470KΩ	½		BTS-470K	
R20	2700Ω	½		BTS-2700	
R21	5600Ω	2		BTB-5600	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	GROMMES PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC @ .62A	690VCT .073ADC	5VAC @ 2A	6.3VCT @ 1.5A	136P2	PM-8409	P-2952	PH-70 ①	R-11B

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		GROMMES PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T2	7.5KΩ CT	16Ω tap @ 8Ω, 4Ω	640Ω CT	.86Ω tap @ .64Ω, .48Ω			A-3027	RO-110	S-28X	

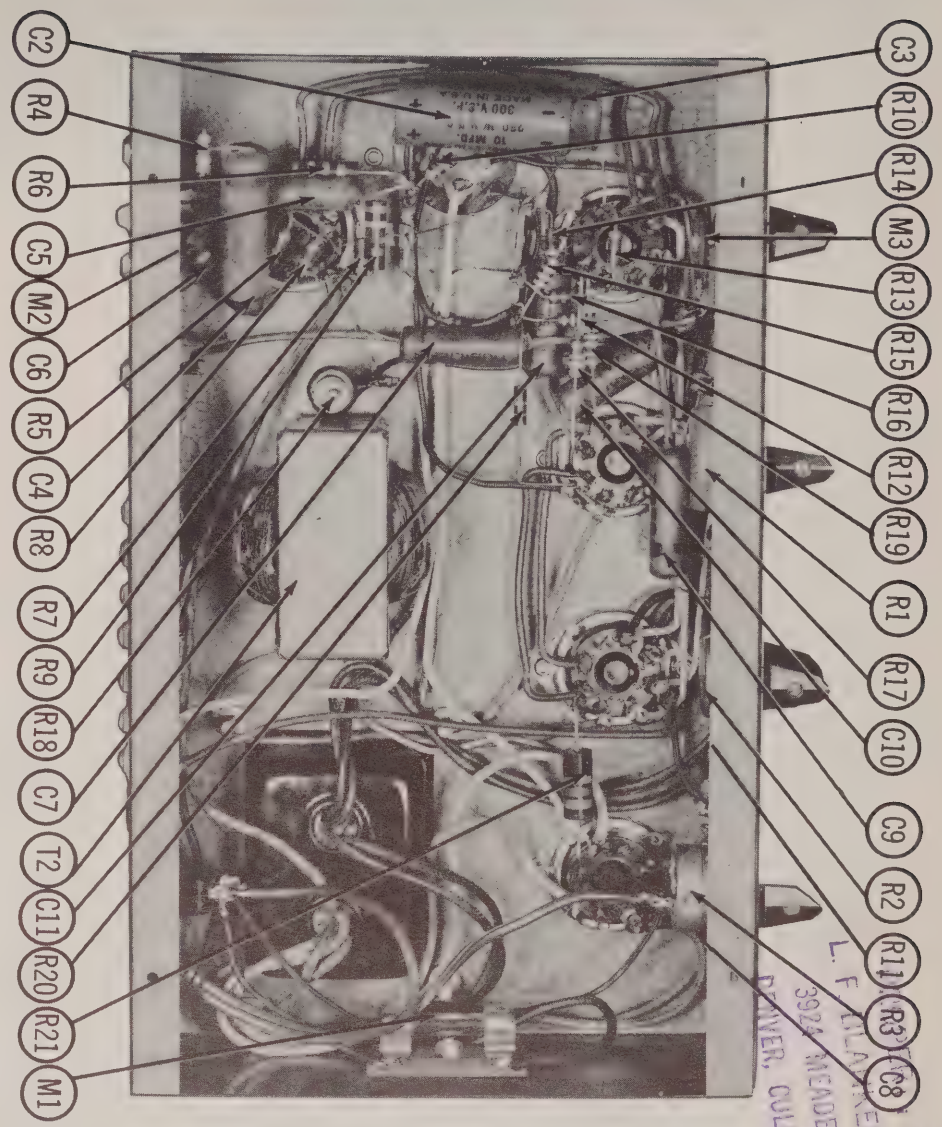
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			GROMMES PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 250V			312002	357001	AGC 2	4405

MISCELLANEOUS

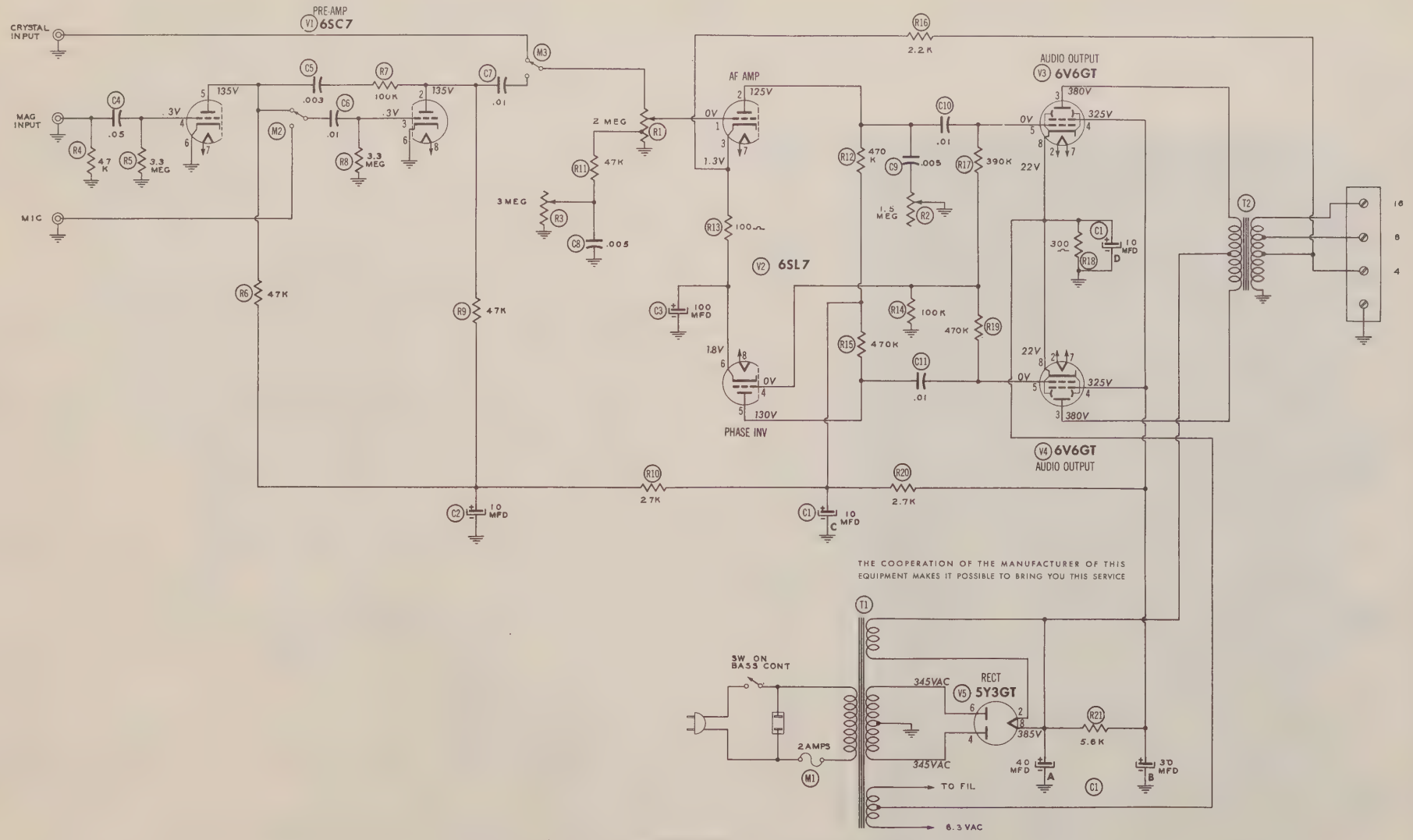
ITEM No.	PART NAME	GROMMES PART No.	NOTES
M2	Switch		Gain Selector, (SPDT Wafer)
M3	Switch		Mic-Phono Selector, (SPDT Slide)

CHASSIS—BOTTOM VIEW



L. F. CLARKENSHIP
3924 MEADE ST.
DENVER, COLORADO

GROMMES MODEL LJ-2



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SC7	0Ω	†82KΩ	3.3Meg	3.3Meg	†82KΩ	0Ω	300Ω	300Ω
V 2	6SL7	0Ω	†480KΩ	2.2KΩ	100KΩ	†480KΩ	2.3KΩ	300Ω	300Ω
V 3	6V6GT	0Ω	300Ω	†325Ω	†5.6KΩ	490KΩ	570KΩ	300Ω	300Ω
V 4	6V6GT	0Ω	300Ω	†315Ω	†5.6KΩ	570KΩ	INF	300Ω	300Ω
V 5	5Y3GT	INF	250KΩ	INF	140Ω	INF	150Ω	INF	250KΩ

† MEASURED FROM PIN 8 OF V5.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1953

194-3

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

PHOTOFACT* Folder

*TRADE MARK

HOFFMAN MODELS 7M112B, 7B113B, 7B114B (Ch. 212, 212M), 21B122, 21B306B, 21B507, 21M121, 21M305B, 21M506, 21P123, 21P307B, 21P508 (Ch. 211, 211M)

DENVER, COLORADO

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MODEL 7M112B

HOFFMAN MODELS 7M112B, 7B113B, 7B114B (Ch. 212, 212M), 21B122, 21B306B, 21B507, 21M121, 21M305B, 21M506, 21P123, 21P307B, 21P508 (Ch. 211, 211M)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

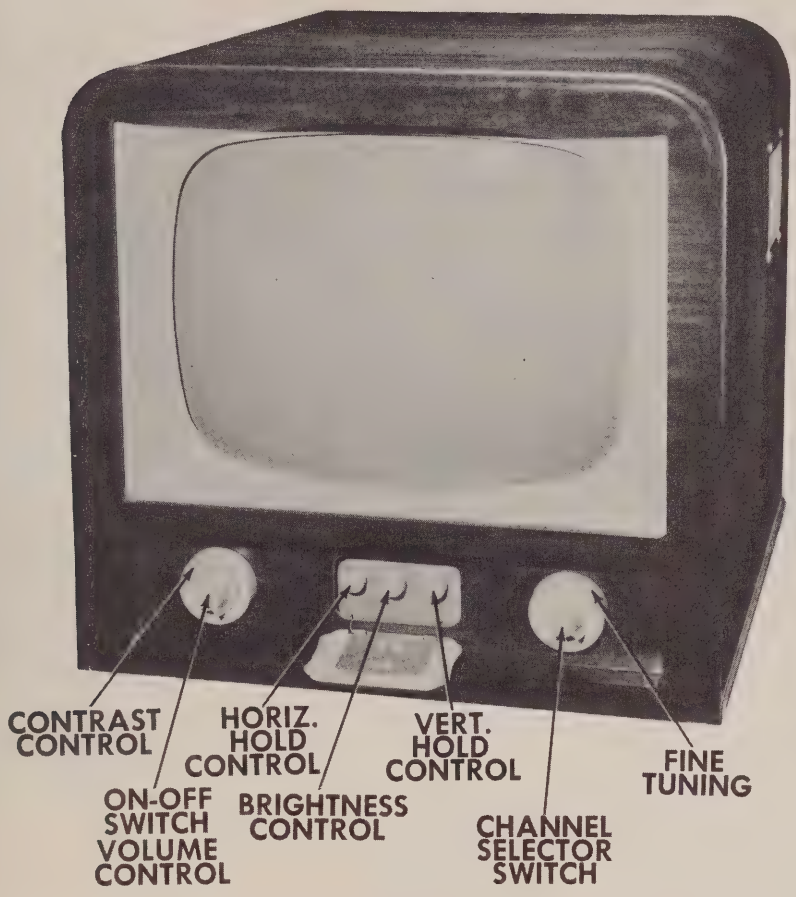
DATE 2–53 SET 194 FOLDER 4

PHOTOFACT* Folder

*TRADE MARK

HOFFMAN MODELS 7M112B, 7B113B, 7B114B (Ch. 212, 212M), 21B122, 21B306B, 21B507, 21M121, 21M305B, 21M506, 21P123, 21P307B, 21P508 (Ch. 211, 211M)

PROPERTY
L. P. O.



HOFFMAN 7M112B

TRADE NAME	Hoffman Models 7M112B, 7B113B, 7P114B (Ch. 212, 212M) 21M121, 21B122, 21F123, 21M305B, 21B306B, 21P307B, 21M506, 21B507, 21P508 (Ch. 211, 211M)
MANUFACTURER	Hoffman Radio Corp., Corp., 3761 Hill St., Los Angeles, California.
TYPE SET	Television Receiver
TUBES	Eighteen
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.2 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.25MC, Sound IF 21.75MC (Intercarrier).

INDEX

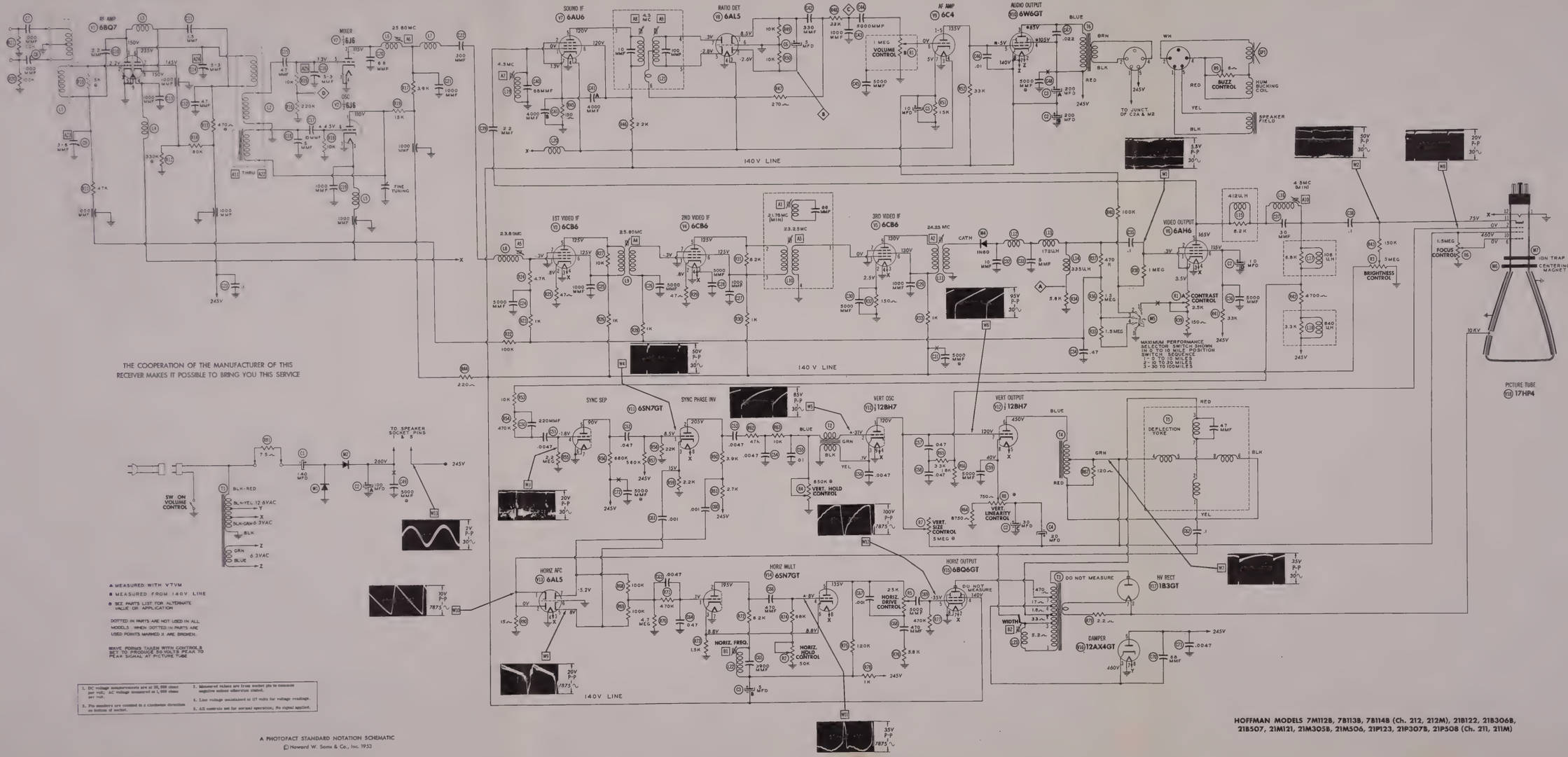
Alignment Instructions 6, 7
Disassembly Instructions 13
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions 14, 15, 16
Photographs
Cabinet - Rear View 11
Capacitor and Alignment Identification 4, 9
Chassis - Top View 3
RF Tuner 10, 18
Photographs (Cont)
Resistor and Inductor Identification 12, 17
Resistance Measurements 8
Schematic 2
Servicing in the Field 13
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

HOFFMAN MODELS 7M112B, 7B113B, 7B114B (Ch. 212, 212M), 21B122, 21B306B, 21B507, 21M121, 21M305B, 21M506, 21P123, 21P307B, 21P508 (Ch. 211, 211M)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

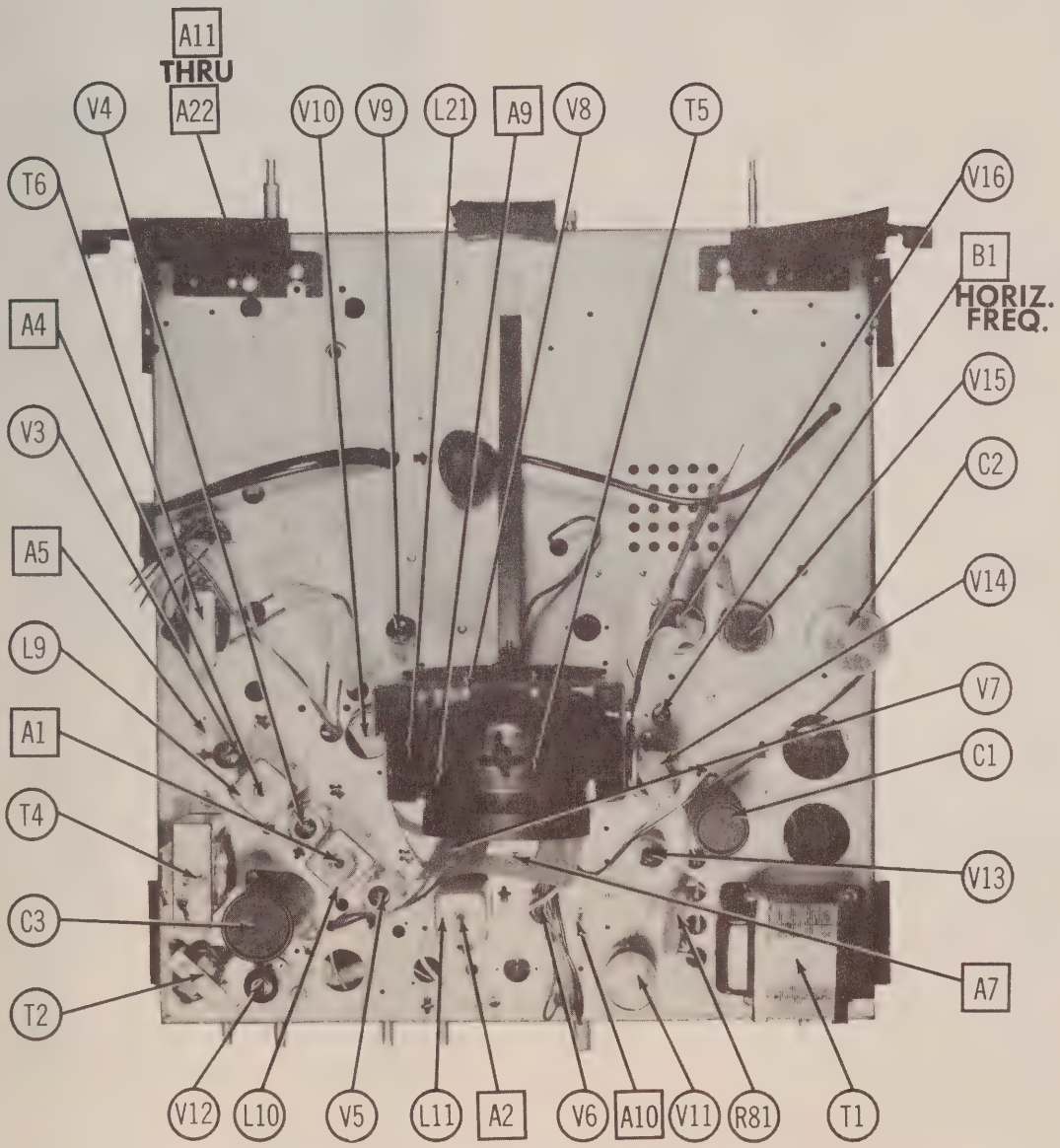
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 2-53 SET 194 FOLDER 4

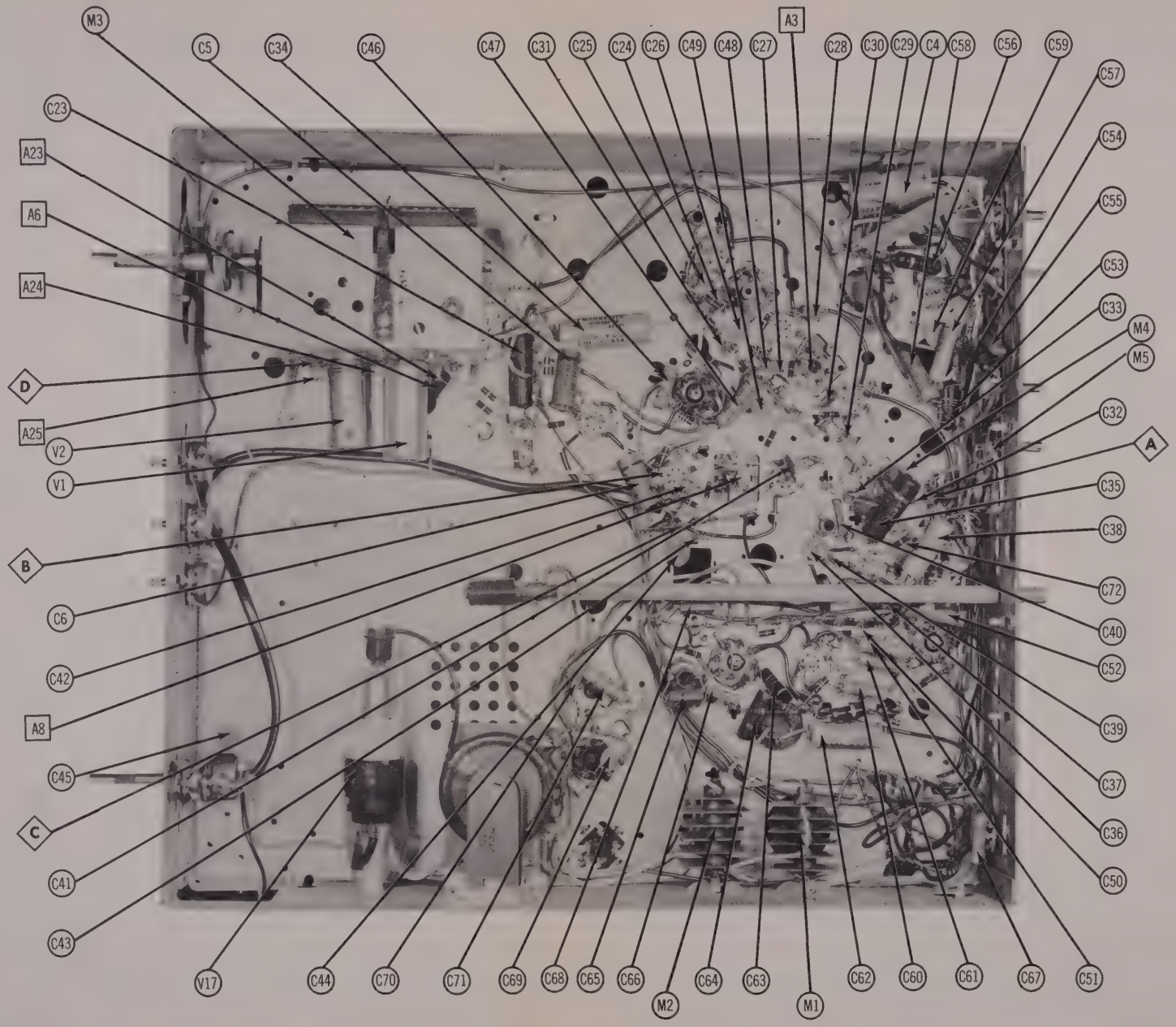

RF AMP V1 6BQ7
MIXER V2 6J6
OSC V3 6J6
25.80MC
SOUND IF V7 6AU6
4.5MC
RATIO DET V8 6AL5
AF AMP V9 6C4
AUDIO OUTPUT V10 6W6GT
VOLUME CONTROL
SPEAKER FIELD
TO JUNCT. OF C2A & M2
BUZZ CONTROL
HUM BUCKING COIL
FINE TUNING
140 V LINE
1ST VIDEO IF V6 6CB6
2ND VIDEO IF V4 6CB6
3RD VIDEO IF V5 6CB6
23.8MC
25.80MC
21.75MC (MIN)
23.25MC
24.25 MC
CATH
VIDEO OUTPUT V6 6AH6
CONTRAST CONTROL
MAXIMUM PERFORMANCE SELECTOR SWITCH SHOWN IN 'C' TO 10 MILE POSITION SWITCH SEQUENCE 1 - 0 TO 10 MILES 2 - 0 TO 30 MILES 3 - 30 TO 100 MILES
4.5MC TRAP
BRIGHTNESS CONTROL
FOCUS CONTROL
ION TRAP CENTERING MAGNET
PICTURE TUBE V18 17HP4
SYNC SEP V11 6SN7GT
SYNC PHASE INV
VERT OSC V13 12BH7
VERT OUTPUT V12 12BH7
VERT. HOLD CONTROL
VERT. LINEARITY CONTROL
VERT. SIZE CONTROL
DEFLECTION YOKE
HORIZ AFC V13 6AL5
HORIZ MULT V14 6SN7GT
HORIZ OUTPUT V15 6BQ6GT
HORIZ. FREQ.
HORIZ. HOLD CONTROL
HORIZ. DRIVE CONTROL
DO NOT MEASURE
HV RECT V17 1B3GT
DAMPER V16 12AX4GT
WIDTH
TO SPEAKER SOCKET PINS 1 & 5
SW ON VOLUME CONTROL
BLK-RED
BLK-YEL 12.6VAC
BLK-GRN 6.3VAC
6.3VAC
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A MEASURED WITH VTVM
B MEASURED FROM 140V LINE
C SEE PARTS LIST FOR ALTERNATE VALUE OF APPLICATION
DOTTED IN PARTS ARE NOT USED IN ALL MODELS WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements are at 20,000 ohms per volt; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction as bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, No signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1953
HOFFMAN MODELS 7M112B, 7B113B, 7B114B (Ch. 212, 212M), 21B122, 21B306B, 21B507, 21M121, 21M305B, 21M506, 21P123, 21P307B, 21P508 (Ch. 211, 211M)

HOFFMAN MODELS 7M112B, 7B113B, 7B114B (Ch. 212, 212M), 21B122, 21B306B, 21B507, 21M121, 21M305B, 21M506, 21P123, 21P307B, 21P508 (Ch. 211, 211M)

PROPERTY OF
L. F. BLAN[illegible]
[illegible]
DENVER, COLORADO

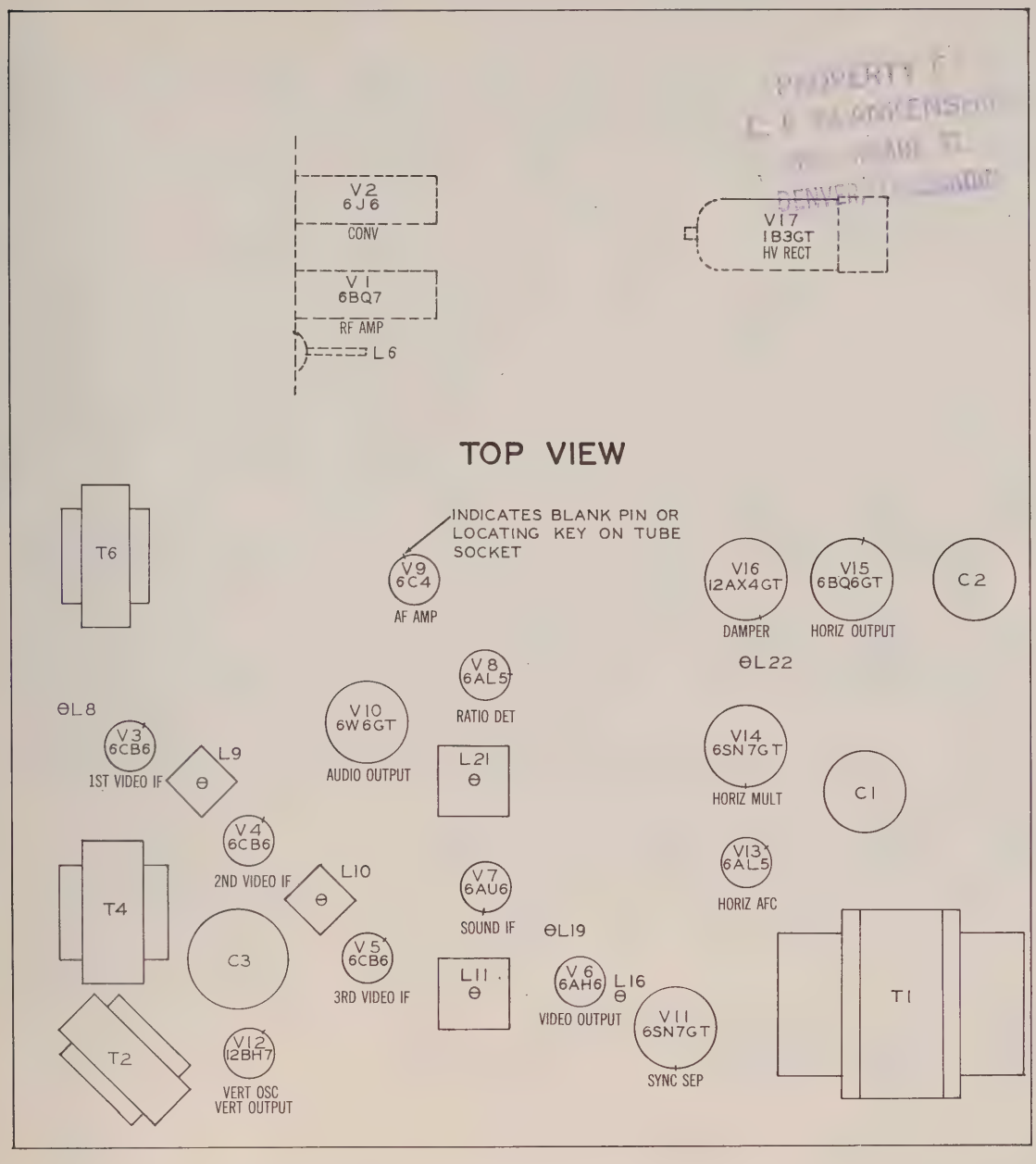


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-Selenium Rectifiers (M1, M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5, V6, V10
No pic, no sound, has snow-V1, V2, V3
No pic, has sound, has raster-V6, V18
Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE
No vert . sync.-V11, V12
No horiz. sync.-V11, V13, V14
No vert. or horiz. sync.-V11

SWEEP FAILURE
No raster, has sound-V14, V15, V16, V17, V18
No vertical deflection-V12
Poor vert. linearity or foldover-V12
Poor horiz. linearity or foldover-V14, V15, V16
Narrow picture-V14, V15, V16, V17, M1, M2
Vert. off freq.-V11, V12
Horiz. off freq.-V11, V13, V14

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal multivibrator tube to disable the high voltage.
Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 Volt battery to the ungrounded side of C34. Connect the positive lead of chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis	21.75MC (Unmod)	Any	DC probe to point (A) Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	24.25MC	"	"	A2	Adjust for maximum deflection.
3.	"	"	23.25MC	"	"	A3	"
4.	"	"	25.60MC	"	"	A4	"
5.	"	"	23.80MC	"	"	A5	"
6.	"	"	25.80MC	"	"	A6	"

(Repeat above alignment, steps 1 thru 6, for optimum results).

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC SWP)	21.75MC 23.25MC 25.25MC 26.25MC	Any	Vert. amp. to point (A). Low side to chassis.		Check for response similar to Fig. 1 within limits as shown. If necessary, retouch A2 thru A6 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.005MFD	High side to point (A) Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B) Common to chassis.	A7, A8	Adjust for maximum deflection.
9.	"	"	"	"	DC probe to point (C) Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side to the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated sugnal withh 60∿ modulation and 450KC sweep. Use 120Ω sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.005MFD	High side to point (A). Low side to chassis.	4.5MC (450KC SWP)	4.5MC	Any	Vert. amp. to point (B). Low side to chassis.	A7, A8	Disconnect stabilizer capacitor C6. Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
9.	"	"	"	"	"	Vert. amp. to point (C). Low side to chassis.	A9	Reconnect capacitor C6. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.005MFD	High side to point (A) Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru detector (Fig. 4) to pin 11 of picture tube. Common to chassis.	A10	Adjust for MINIMUM deflection.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC SWP)	211.25MC 215.75MC	13	Vert amp. to point (A). Low side to chassis.	A11	Adjust to place sound marker in trap notch as in Fig. 5.
			207MC (10MC SWP)	205.25MC 209.75MC	12		A12	
			201MC (10MC SWP)	199.25MC 203.75MC	11		A13	
			195MC (10MC SWP)	193.25MC 197.75MC	10		A14	
			189MC (10MC SWP)	187.25MC 191.75MC	9		A15	
			183MC (10MC SWP)	181.25MC 185.75MC	8		A16	
			177MC (10MC SWP)	175.25MC 179.75MC	7		A17	
			85MC (10MC SWP)	83.25MC 87.75MC	6		A18	
			79MC (10MC SWP)	77.25MC 81.75MC	5		A19	
			69MC (10MC SWP)	67.25MC 71.75MC	4		A20	
			63MC (10MC SWP)	61.25MC 65.75MC	3		A21	
			57MC (10MC SWP)	55.25MC 59.75MC	2		A22	

ALIGNMENT INSTRUCTIONS (CONT.)

RF ALIGNMENT

Connect the symchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC SWP)	205.25MC 209.75MC	12	Vert. amp. to point ◇D. Low side to chassis.	A23, A24 A25	Adjust for response curve similar to Fig. 6.
13.	"	"	213MC (10MC SWP)	211.25MC 215.75MC	13			Check for response similar to Fig. 6. If markers fall below 70% on any channel, make compromise adjustments of A23, A24 and A25 with receiver tuned to that channel. Then check other channels to see that they have not been seriously affected.
			201MC (10MC SWP)	199.25MC 203.75MC	11			
			195MC (10MC SWP)	193.25MC 197.75MC	10			
			189MC (10MC SWP)	187.25MC 191.75MC	9			
			183MC (10MC SWP)	181.25MC 185.75MC	8			
			177MC (10MC SWP)	175.25MC 179.75MC	7			
			85MC (10MC SWP)	83.25MC 87.75MC	6			
			79MC (10MC SWP)	77.25MC 81.75MC	5			
			69MC (10MC SWP)	67.25MC 71.75MC	4			
			63MC (10MC SWP)	61.25MC 65.75MC	3			
			57MC (10MC SWP)	55.25MC 59.75MC	2			

PROPERTY OF
L. F. PLANK ENGINEERING
2024 NEAFE ST.
DENVER, COLORADO

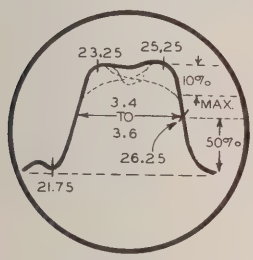


FIG.1

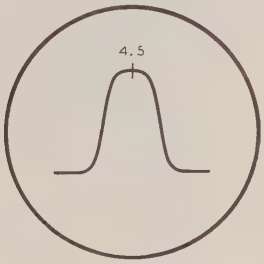


FIG. 2

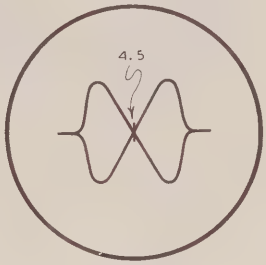


FIG. 3

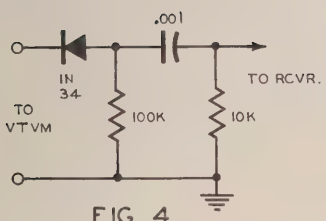


FIG. 4

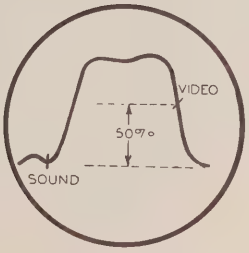


FIG.5

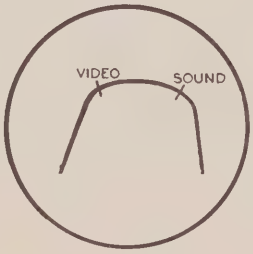


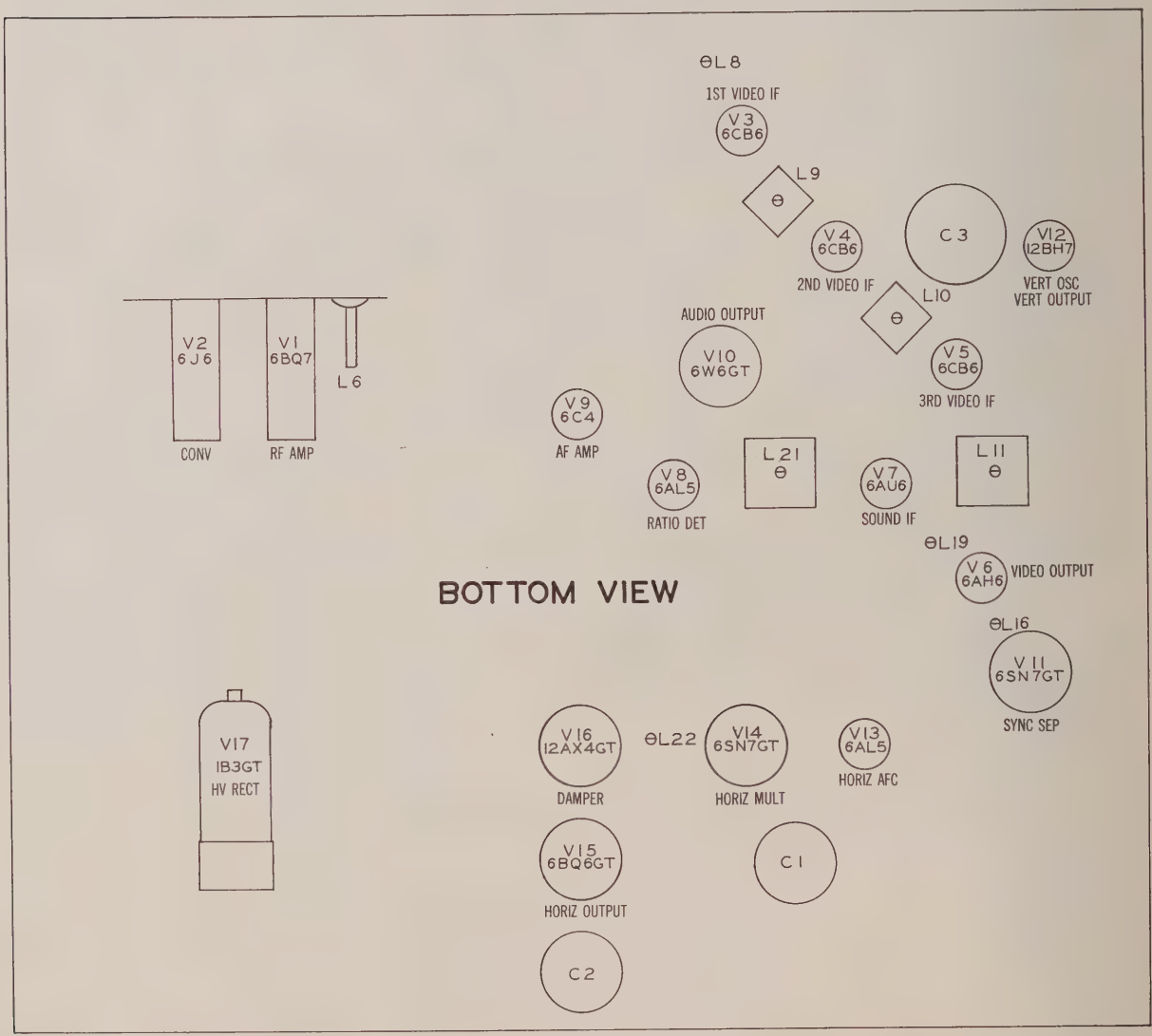
FIG.6

HOFFMAN MODELS 7M112B, 7B113B, 7B114B (Ch. 212, 212M), 21B122, 21B306B, 21B507, 21M121, 21M305B, 21M506, 21P123, 21P307B, 21P508 (Ch. 211, 211M)

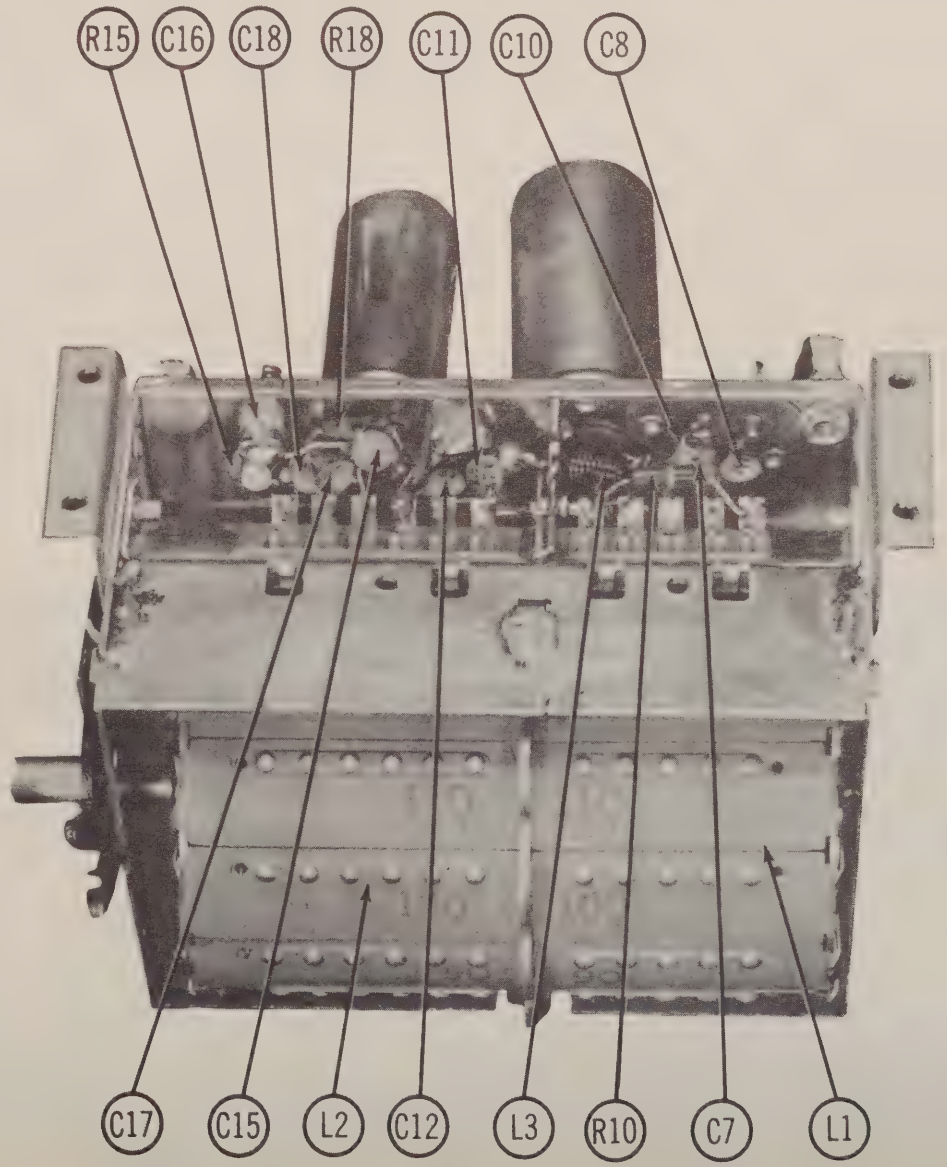
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7	INF	1.7Meg	0Ω	.1Ω	0Ω	#690Ω	145KΩ	INF	0Ω
V 2	6J6	†15KΩ	†4KΩ	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6CB6	1.5Meg	47Ω	0Ω	.1Ω	#1KΩ	#1KΩ	0Ω		
V 4	6CB6	1.5Meg	47Ω	.1Ω	0Ω	#1KΩ	#1KΩ	0Ω		
V 5	6CB6	.2Ω	150Ω	.1Ω	0Ω	#1KΩ	#1KΩ	0Ω		
V 6	6AH6	1.1Meg	430Ω	0Ω	.1Ω	†4.7KΩ	†33KΩ	430Ω		
V 7	6AU6	1.1Ω	150Ω	.1Ω	0Ω	#2.2KΩ	#2.2KΩ	150Ω		
V 8	6AL5	10KΩ	10KΩ	.1Ω	0Ω	INF	0Ω	INF		
V 9	6C4	†33KΩ	INF	0Ω	.1Ω	†33K	18Ω	1.5KΩ		
V 10	6W6GT	INF	#.1Ω	†283Ω	†57Ω	†33KΩ	INF	#0Ω	80KΩ	
V 11	6SN7GT	22KΩ	†6.6KΩ	2.2KΩ	2.2KΩ	†680KΩ	0Ω	0Ω	.1Ω	
V 12	12BH7	■2.1Meg	540KΩ	70Ω	.1Ω	.1Ω	■755Ω	■2.1Meg	9.5KΩ	0Ω
V 13	6AL5	15Ω	15Ω	.1Ω	0Ω	4.8Meg	0Ω	4.8Meg		
V 14	6SN7GT	5.2Meg	†9.3KΩ	1.5KΩ	100KΩ	†121KΩ	1.5KΩ	0Ω	.1Ω	
V 15	6BQ7GT	INF	.1Ω	INF	#0Ω	470KΩ	†122KΩ	0Ω	0Ω	Top Cap #18Ω
V 16	12AX4GT	INF	#17Ω	120KΩ	INF	†57Ω	INF	0Ω	.2Ω	
V 17	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								Top Cap #489Ω
V 18	17HP4	0Ω	1.8KΩ	Pin 6 45Ω	Pin 10 ■141Ω	Pin 11 1.4Meg	Pin 12 .1Ω			

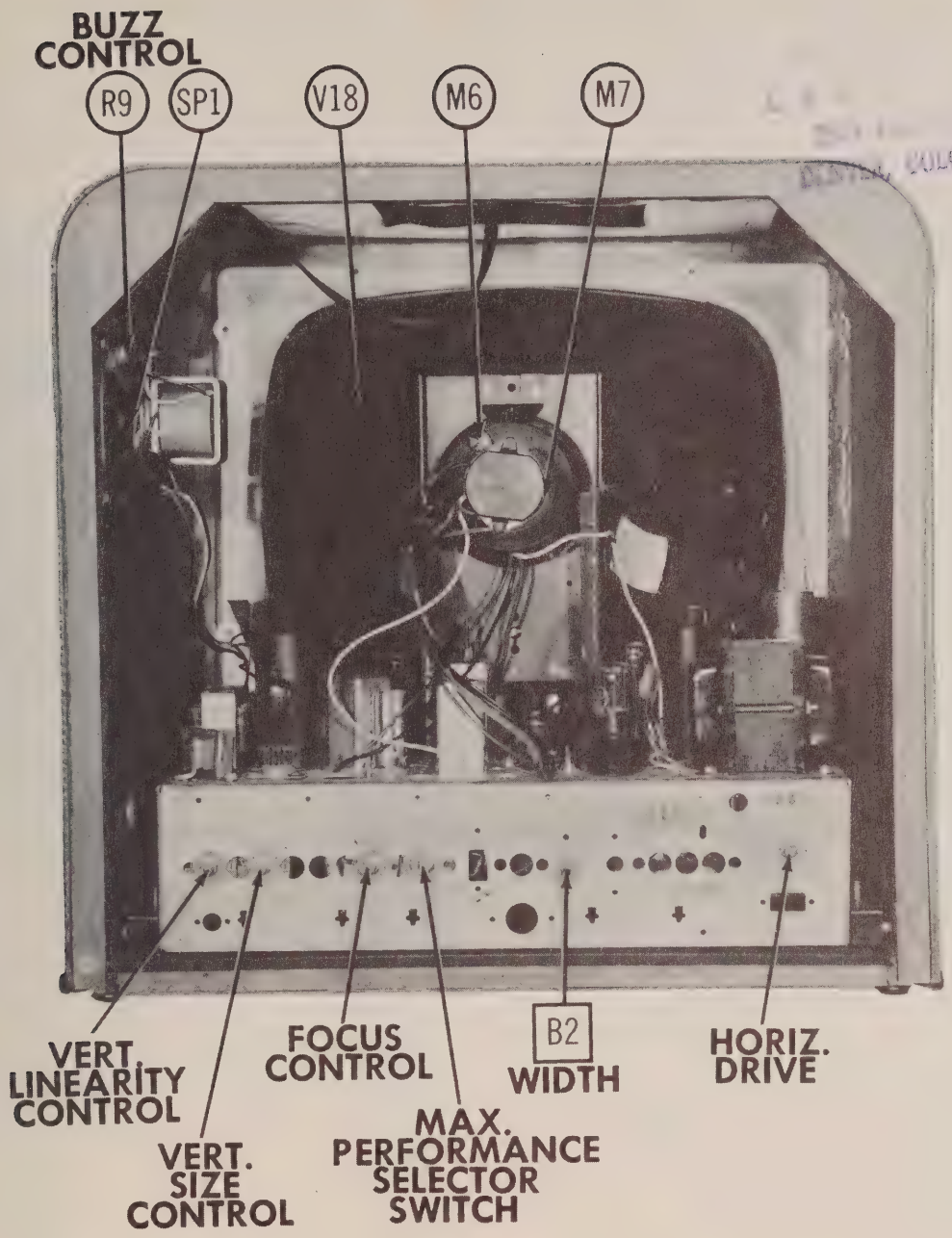
† MEASURED FROM OUTPUT OF M2
# MEASURED FROM 140 VOLT LINE
■ MEASURED FROM PIN 3 OF V16



TUBE PLACEMENT CHART



RF TUNER-LEFT SIDE



CABINET–REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

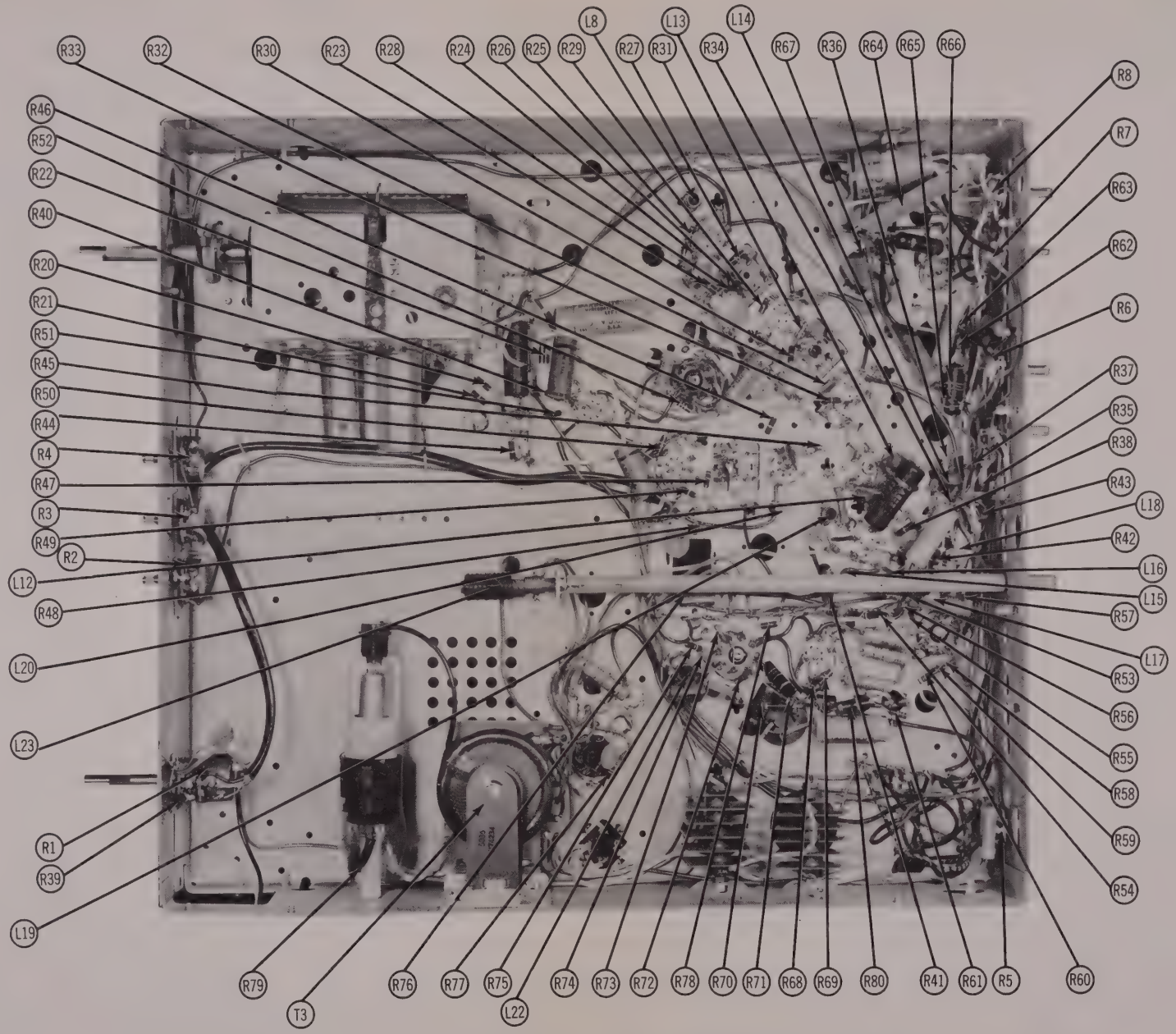
Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal hold control for horizontal synchronization without bending of vertical lines near the top of the picture.

If unable to obtain satisfactory horizontal synchronization by means of the horizontal hold control, adjust the horizontal frequency slug (B1). Turn B1 counter clockwise while turning the channel selector on and off channel until sync is lost. Turn B1 clockwise and note number of diagonal bars just before sync pull in. There should be not less than 2 bars. Continue turning B1 clockwise until sync is lost again, then turn B1 counter-clockwise and note the point where sync pull in occurs. Turn B1 an additional ½ turn counter clockwise.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal drive control for the best compromise between brightness and horizontal linearity.



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the channel selector shaft.

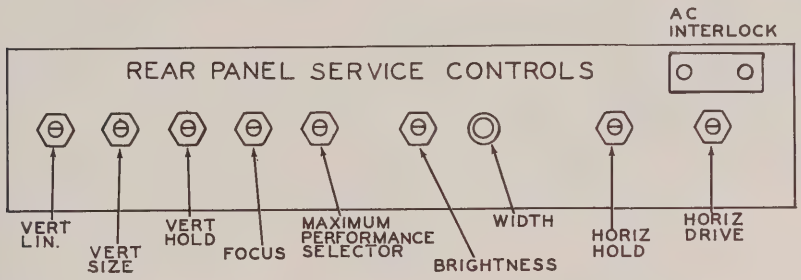
PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For the adjustment of the Horiz. oscillator slug, it is necessary to remove the rear cover, and supply power to set with a cheater cord. Adjustment is located on top of chassis. (See tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate detector buzz, adjust the ratio det. secondary (L21) located on top of chassis. (See tube placement chart).

CENTERING

Horizontal and vertical centering is accomplished by mechanical means. Rotate centering magnet around the neck of picture tube until centering of picture is accomplished.

DISASSEMBLY INSTRUCTIONS

① Chassis Removal.

A. Remove 4 push on type control knobs from front panel.

B. Disconnect built-in antenna and transmission line from rear cover.

C. Remove 6 wood screws. Remove rear cover.

D. Disconnect speaker. Remove 4 speaker nuts. Remove speaker.

E. Remove 4 chassis bolts. Remove chassis.

② Picture Tube Removal

A. Removal of chassis is necessary.

③ Picture Tube Cleaning

A. Removal of chassis is necessary.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: HOFFMAN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1A	RF Amplifier	6BQ7	6BQ7	9AJ	
B	RF Amplifier	6BK7	6BK7	9AJ	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output	6AH6	6AH6	7BK	
V7	Sound IF Amp.	6AU6	6AU6	7BK	
V8	Ratio Detector	6AL5	6AL5	6BT	
V9	AF Amplifier	6C4	6C4	6BG	
V10	Audio Output	6W6GT	6W6GT	7S	
V11	Sync Separator Sync Phase Inv.	6SN7GT	6SN7GT	8BD	
V12	Vert. Oscillator – Vert. Output	12BH7	12BH7	9A	
V13	Horiz. AFC	6AL5	6AL5	6BT	
V14	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V15	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V16	Damper	12AX4GT	12AX4GT	4CG	
V17	HV Rectifier	1B3GT	1B3GT	3C	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: HOFFMAN PART No.	REPLACEMENT DATA: SYLVANIA PART No.	RTMA BASE TYPE	NOTES
V18A	17HP4	17HP4	12C	① Circuit changes necessary
B	17TP4		12C	
C	21EP4A		12C	
D	21MP4		12C	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	140	150	4245	E3A249		XA004		FP17	2R267	
C2A	▲100	300	4246	E4D491		D109		FP419.4	TVL-4561	
B	▲200	150								
C	30	150								
D	■10	300								
C3A	▲200	150	4243	E4B257		XB006		FP216.1	TVL-2444	
B	▲5	150				BR415				
C4	20	450	4233	PRS450/20		BR2045A		TC75	TVA-1709	
C5	10	50	4244	PRS50/10		BR105		TC32	TVA-1304	
C6	5	50	4209	PRS150/4		BR550		TC30	TVA-1303	
C7	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C8	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C9	3-8				829-10					
C10	2.2				TCZ-2.2		NP0K-2R2			5TCCB-V22
C11	1.5			SH.5NP0	TCZ-1.5		NP0K-1R5			5TCCB-V15
C12	47			BPD-000047	D6-470	TM5Q5	GP1K-470	UC-5447		5GA-Q47
C13	1000			BPD-001	DD-102	TM5D1	801-001	DC-521		5HK-D1
C14	.5-3				829-3			CT565A		
C15	47			BPD-000047	D6-470	TM5Q5	GP1K-470	UC-5447		5GA-Q47
C16	.5-3				829-3			CT565A		
C17	10			SL10NP0	TCZ-10		NP0K-100	ZT-541		5TCC-Q1
C18	5			SL5N750	TCN-5		N750K-050	NT-555		5TCU-Q5
C19	1000			BPD-001	DD-102	TM5D1	801-001	DC-521		5HK-D1
C20	6.8			SL6.8NP0	TCZ-6.8		NP0K-6R8	ZT-5568		5TCCB-V68
C21	1000			BPD-001	DD-102	TM5D1	801-001	DC-521		5HK-D1
C22	300			SL300	D6-301		GP2K-301	UC-533		5GA-T3
C23	.1	400	4150	P488-1	DF-104	PTE4P1		PT401		4TM-P1
C24	5000		4029	BPD-005	DD-502	TM5D5	811-005	DC-525		5HK-D5
C25	1000		14031	BPD-001	DD-102	TM5D1	801-001	DC-521		5HK-D1
C26	5000		4029	BPD-005	DD-502	TM5D5	811-005	DC-525		5HK-D5
C27	1000		14031	BPD-001	DD-102	TM5D1	801-001	DC-521		5HK-D1
C28	5000		4029	BPD-005	DD-502	TM5D5	811-005	DC-525		5HK-D5
C29	1000		14031	BPD-001	DD-102	TM5D1	801-001	DC-521		5HK-D1
C30	5000		4029	BPD-005	DD-502	TM5D5	811-005	DC-525		5HK-D5
C31	5000		4029	BPD-005	DD-502	TM5D5	811-005	DC-525		5HK-D5 Note 1
C32	10		14036	SL10	D6-100		GP1K-100	UC-541		5GA-Q1
C33	5		4093	SL5	TCZ-4.7		GP1K-050	UC-555		5GA-V5
C34	.47	200	4173	P288-47		PJ2P5		PT405		2TM-P47
C35	.1	200	4143	P288-1	DF-104	PJ2P1		PT401		2TM-P1
C36	5000		4029	BPD-005	DD-502	TM5D5	811-005	DC-525		5HK-D5
C37	30		4043	SL30	D6-300		GP1K-300	UC-543		5GA-Q3
C38	.1	400	4150	P488-1	DF-104	PTE4P1		PT401		4TM-P1
C39	2.2		4069		TCZ-2.2		NP0K-2R2			5TCCB-V22
C40	68		4046							
C41A	4000		4036	BPD-2X004	D6-402	TM5DD5	822-004	DCD-524	5HK-2D4	
B	4000				D6-402					
C42	330		4065	SL330	D6-331		GP2K-331	UC-5333		5GA-T33
C43	1000		14031	BPD-001	DD-102	TM5D1	801-001	DC-521		5HK-D1
C44	5000		4029	BPD-005	DD-502	TM5D5	811-005	DC-525		5HK-D5
C45	5000		4029	BPD-005	DD-502	TM5D5	811-005	DC-525		5HK-D5
C46	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411		4TM-S1
C47	.022	600	4124	P688-022	DF-203	PTE6S22		PT6122		6TM-S22
C48	5000		4029	BPD-005	DD-502	TM5D5	811-005	DC-525		5HK-D5 Note 1
C49	5000		4029	BPD-005	DD-502	TM5D5	811-005	DC-525		5HK-D5 Note 1
C50	220		4084	SI220	D6-221	5WST25	GP2K-221	UC-5322		5GA-T22
C51	.0047	600	4127	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247		6TM-D47
C52	.047	400	4148	P488-047	DF-503	PTE4S47		PT4147		4TM-S47
C53	.0047	400	4127	P488-0047	D6-472	PTE6D47	GP2-333-472	PT6247		6TM-D47
C54	.0047	400	4127	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247		6TM-D47
C55	.01	400	4142	P488-01	D6-103	PTE4S1	GP2-333-103	PT411		4TM-S1
C56	.0047	400	4128	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247		6TM-D47
C57	.047	400	4148	P488-047	DF-503	PTE4S47		PT4147		4TM-S47
C58	.047	400	4148	P488-047	DF-503	PTE4S47		PT4147		4TM-S47
C59	5000		4029	BPD-005	DD-502	TM5D5	811-005	DC-525		5HK-D5
C60	.001	400	4174	P688-001	D6-102	PTE6D1	GP2L-102	PT621		6TM-D1
C61	.001	400	4174	P688-001	D6-102	PTE6D1	GP2L-102	PT621		6TM-D1

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C62	.1	600	4144	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C63	.0047	400	4128	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C64	.047	400	4147	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C65	3900	500	4085	1464-004		1DR5D4		MCB463	MS-24	
C66	470	500	14009	1469-0005		2R5T5		MCB245	MS-35	
C67	.001	400	4174	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C68	470	500	14009	1469-0005		2R5T5		MCB245	MS-35	
C69	5000		4029	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C70	68	3000	14042							
C71	.0047	600	4127	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C72	5000		4029	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	Note 1

Note 1. Not used in all Models.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: HOFFMAN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2500Ω	½	4892	QJ-403*	RTV-379		UF252L	Contrast-Panel
B	1Meg	½					UR16-T35 †	Volume - Tapped
								② 300KΩ - Rear
C	Switch						US-26	Attach to R1B
R2A	50KΩ	½	4894	QJ-123	AG-49-S		U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KSS-3		Not Req.	Attach to R2A
R3A	5Meg	½	4895	QJ-141	AG-85-S	AB-87	U-67	Brightness
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R3A
R4A	850KΩ	½	4893	QJ-133	AG-58-S		U-50	Vert. Hold - See Note 1
B	Shaft		Not Req.	Not Req.	KSS-3		Not Req.	Attach to R4A
R5A	25KΩ	½	4859	QJ-120	AG-40-S	AB-26	SU-29	Horiz. Drive
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R5A
R6A	1.5Meg	½	4871	QJ-138	AG-83-S	AB-75	U-155	Focus
B	Shaft		Not Req.	Not Req.	KSS-3	AK-1	Not Req.	Attach to R6A
R7A	5Meg	½	4876	QJ-141	AG-85-S		U-67	Vert. Size - See Note 2
B	Shaft		Not Req.	Not Req.	KSS-3		Not Req.	Attach to R7A
R8A	750Ω	½	4875	QJ-105	AG-8-S	AB-5	U-4	Vert. Linearity
B	Shaft		Not Req.	Not Req.	KSS-3	AK-1	Not Req.	Attach to R8A
R9	6Ω	1						Buzz - See Note 3

Note 1. Connect a 330KΩ resistor in series with clockwise terminal & ground.
Note 2. Connect a 1Meg resistor in series with clockwise terminal & positive side of C4.
Note 3. Not used in all Models.
† Universal replacement (Mallory exact duplicate - part #UE382S)
* CONCENTRIKIT EQUIVALENT - KIT K-2, BASE ELEMENTS & SHAFTS B17-111 & P1-114 (Panel) B13-137X & R1-202 (Rear) & SWITCH 78-1.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: HOFFMAN PART No.	IRC PART No.	NOTES
R10	15KΩ	½			Note 1
R11	47KΩ	½			
R12	330KΩ	½		BTS-330K	Note 2
R13	470Ω	½		BTS-470Ω	Note 3
R14	180KΩ	½			
R15	10KΩ	½		BTS-10K	
R16	220KΩ	½			
R17	3900Ω	½		BTS-3900	
R18	10KΩ	½		BTS-10K	
R19	15KΩ	½			
R20	100KΩ	½	4511	BTS-100K	
R21	100KΩ	½	4511	BTS-100K	
R22	100KΩ	½	4511	BTS-100K	
R23	1000Ω	½	4659	BTS-1000	
R24	4700Ω	½	4576	BTS-4700	
R25	47Ω	½	4639		
R26	1000Ω	½	4659	BTS-1000	
R27	10KΩ	½	4597		
R28	1000Ω	½	4659	BTS-1000	
R29	47Ω	½	4639		
R30	1000Ω	½	4659	BTS-1000	
R31	8200Ω	½	4651	BTS-8200	
R32	150Ω	½	4616	BTS-150	
R33	1000Ω	½	4659	BTS-1000	
R34	5600Ω	½	4629	BTS-5600	
R35	1.5Meg	½	4605	BTS-1.5Meg	
R36	1.5Meg	½	4605	BTS-1.5Meg	
R37	470KΩ	½	4606	BTS-470K	
R38	1 Meg	½	4614	BTS-1 Meg	
R39	150Ω	½	4616	BTS-150	
R40	100KΩ	½	4511	BTS-100K	
R41	33KΩ	1	24629	BTA-33K	
R42	4700Ω	2	24558	BTB-4700	
R43	150KΩ	½	4589	BTS-150K	
R44	220Ω	½	4563	BTS-220	
R45	150Ω	½	4616	BTS-150	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: HOFFMAN PART No.	IRC PART No.	NOTES
R46	2200Ω	½	4650	BTS-2200	
R47	270Ω	½	4663	BTS-270	
R48	33KΩ	½	4586	BTS-33K	
R49	10KΩ-5%	½	4624	BTS-10K-5%	
R50	10KΩ-5%	½	4624	BTS-10K-5%	
R51	1500Ω	½	4630	BTS-1500	
R52	33KΩ	½	4586	BTS-33K	
R53	10KΩ	½	4597	BTS-10K	
R54	470KΩ	½	4606	BTS-470K	
R55	2.2Meg	½	4606	BTS-2.2Meg	
R56	680KΩ	½	34568	BTS-680K	
R57	560KΩ	½	4590	BTS-560K	
R58	22KΩ	½	4628	BTS-22K	
R59	2200Ω	½	4560	BTS-2200	
R60	3900Ω	½	4527	BTS-3900	
R61	2700Ω	½	4579	BTS-2700	
R62	47KΩ	½	4559	BTS-47K	
R63	10KΩ	½	4597	BTS-10K	
R64	8750	3	4760	1 3/4A-9000	
R65	3300Ω	½	4607	BTS-3300	
R66	1800Ω	½	4640	BTS-1800	
R67	120Ω	½	4546	BTS-120	
R68	100KΩ	½	4571	BTS-100K	
R69	100KΩ	½	4571	BTS-100K	
R70	4.7Meg	½	4544	BTS-4.7Meg	
R71	470KΩ	½	4606	BTS-470K	
R72	8200Ω	½	4651	BTS-8200	
R73	1500Ω	½	4630	BTS-1500	
R74	68KΩ	½	4600	BTS-68K	
R75	120KΩ	½	4548	BTS-120K	
R76	5600Ω	½	4629	BTS-5600	
R77	470KΩ	½	4622	BTS-470K	
R78	1000Ω	½	4659	BTS-1000	
R79	2.2Ω	2	4735		
R80	15Ω	2	14509		
R81	7.5Ω	5	4762		

Note 1. Some models use a 22KΩ resistor in this application.
Note 2. Some models use a 220KΩ resistor in this application.
Note 3. Some models use a 1000Ω resistor in this application.

TRANSFORMER (FILAMENT)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: HOFFMAN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC	6.3VAC			5034				
	②.56A tap ③ 12.6V	③ 1.2A							
	③.84A tap ④ 6.3V								
	④ 6.8A								

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: HOFFMAN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	70Ω	320Ω	5176	A-8125	A-3000 ①	TBO-2 ②	A-97X	Vert. Osc. Trans.
T3	527Ω tap ③ 5.2Ω, 38.2Ω, 40Ω, 57Ω	0Ω	5035		HVO-9	TFB-13	D-19	Horiz. Output Trans.
T4	750Ω		5177	A-8140 ③④	A-3081 ①	TSO-6③④	A-103X①④	Vert. Output Trans.
	tap ④ 1Ω							
T5A	35Ω		9761	DY-10 ⑤	MDF-30⑤	TY-4 ⑤	Y-20 ⑤	Horiz. Deflection Coil
B	3.4Ω							Vert. Deflection Coil

① Drill one new mounting hole.
② Mount on top of chassis.
③ Drill new mounting holes.
④ Connect as Auto Trans.
⑤ Use original deflection coil network.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: HOFFMAN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T6	2.2KΩ	3.3Ω	22Ω	.4Ω	5176	A-3876	A-2926	RO-2	S-2X	

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: HOFFMAN PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	6-1/4"	57Ω	3.3Ω	9086 9085 ①		52E57S	① Alternate speaker

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: HOFFMAN PART No.	MERIT PART No.	NOTES
L1A	Ant. Coil	0ΩCT	0Ω	5360K		Channel 2
B	Ant. Coil	0ΩCT	0Ω	5361K		Channel 3
C	Ant. Coil	0ΩCT	0Ω	5362K		Channel 4
D	Ant. Coil	0ΩCT	0Ω	5363K		Channel 5
E	Ant. Coil	0ΩCT	0Ω	5364K		Channel 6
F	Ant. Coil	0ΩCT	0Ω	5365		Channel 7
G	Ant. Coil	0ΩCT	0Ω	5366K		Channel 8
H	Ant. Coil	0ΩCT	0Ω	5367K		Channel 9
I	Ant. Coil	0ΩCT	0Ω	5368K		Channel 10
J	Ant. Coil	0ΩCT	0Ω	5369K		Channel 11
K	Ant. Coil	0ΩCT	0Ω	5370K		Channel 12
L	Ant. Coil	0ΩCT	0Ω	5371K		Channel 13
L2A	RF,Mixer Grid & Osc. Coil	0Ω	0Ω	5348K		Channel 2
B	RF,Mixer Grid & Osc. Coil	0Ω	0Ω	5349K		Channel 3
C	RF,Mixer Grid & Osc. Coil	0Ω	0Ω	5350K		Channel 4
D	RF,Mixer Grid & Osc. Coil	0Ω	0Ω	5351K		Channel 5
E	RF,Mixer Grid & Osc. Coil	0Ω	0Ω	5352K		Channel 6
F	RF,Mixer Grid & Osc. Coil	0Ω	0Ω	5353K		Channel 7
G	RF,Mixer Grid & Osc. Coil	0Ω	0Ω	5354K		Channel 8
H	RF,Mixer Grid & Osc. Coil	0Ω	0Ω	5355K		Channel 9
I	RF,Mixer Grid & Osc. Coil	0Ω	0Ω	5356K		Channel 10
J	RF,Mixer Grid & Osc. Coil	0Ω	0Ω	5357K		Channel 11
K	RF,Mixer Grid & Osc. Coil	0Ω	0Ω	5358K		Channel 12
L	RF,Mixer Grid & Osc. Coil	0Ω	0Ω	5359K		Channel 13
L3	Neutralizing Coil	0Ω				
L4	Fil. Choke	0Ω				
L5	Fil. Choke	0Ω				
L6	Conv. Plate	.5Ω				
L7	RF Choke	.1Ω				
L8	1st. Video IF	.2Ω		5446	TV-112*	
L9	2nd. Video IF	.3Ω	.2Ω	5444		
L10	3rd. Video IF	.3Ω	.3Ω	5458		Includes Trap
L11	4th. Video IF	.4Ω	.4Ω	5445		
L12	RF Choke	2.4Ω		5166		
L13	Series Peak. Coil	6Ω		5448	TV-184	172 Microhenries
L14	Shunt Peak. Coil	9Ω		5449	TV-185	335 Microhenries
L15	Series Peak. Coil	10Ω		5450	TV-188†	412 Microhenries:Wound on 8.2KΩ resistor.
L16	4.5MC Trap	2.2Ω		5453	TV-151	
L17	Shunt Peak. Coil	5Ω		5451	TV-181■	106 Microhenries:Wound on 6.8KΩ resistor.
L18	Shunt Peak. Coil	14.5Ω		5452		840 Microhenries:Wound on a 3.3KΩ resistor.
L19	Sound IF	1.1Ω		5454	TV-151	
L20	Fil. Choke	0Ω		5181		
L21	Ratio Det.	4Ω	.8Ω CT	5443	TV-110	Tertiary windings-.6Ω
L22	Horiz. Osc.	54Ω		5447	TV-163	
L23	Width Coil	12Ω		6464	MWC-1*	

† Parallel with 8.2KΩ resistor.
* Enlarge mtg. holes.
■ Parallel with 6.8KΩ resistor.

HOFFMAN MODELS 7M112B, 7B113B, 7B114B (Ch. 212, 212M), 21B122, 21B306B, 21B507, 21M121, 21M305B, 21M506, 21P123, 21P307B, 21P508 (Ch. 211, 211M)

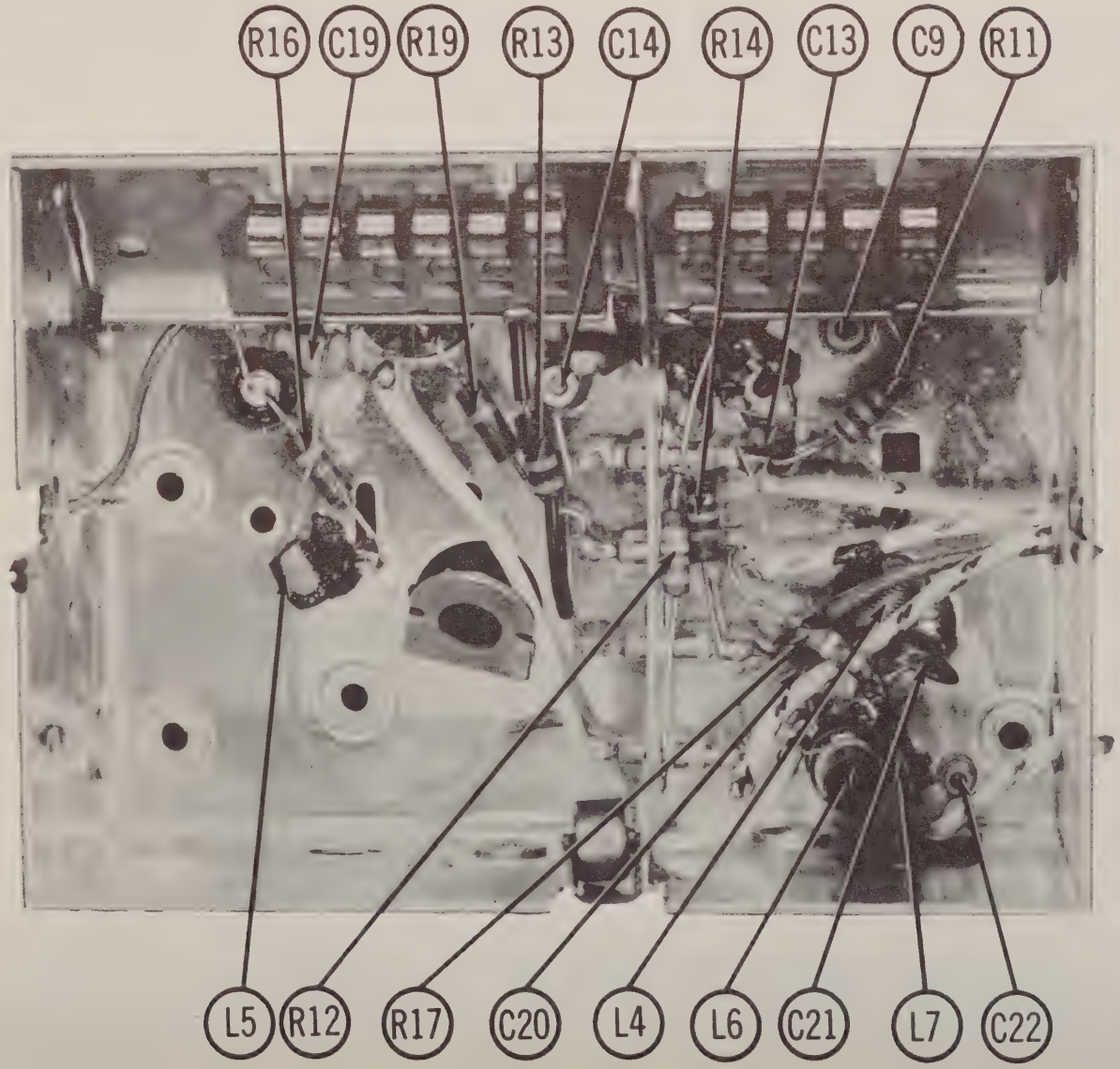
PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

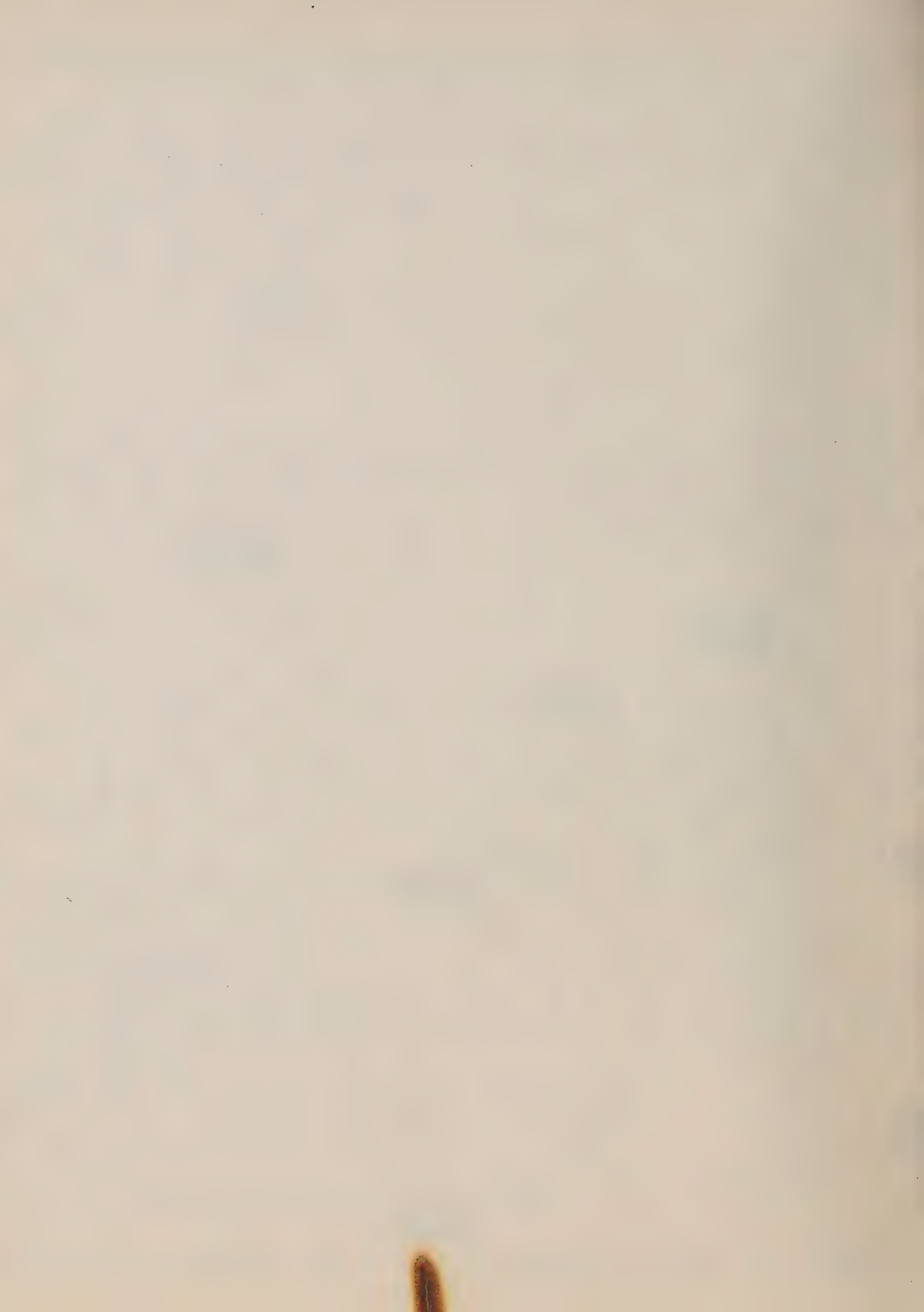
ITEM No.	RATING	REPLACEMENT DATA					
	CURRENT	HOFFMAN PART No.	SYLVANIA PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.
M1	.200A	9735	NK5	6Q4	1090A	6S300	300
M2	.200A	9735	NK5	6Q4	1090A	6S300	300

MISCELLANEOUS

ITEM No.	PART NAME	HOFFMAN PART No.	NOTES
M3	RF Tuner	9755	
M4	Crystal Diode	9075	Video Detector (1N60)
M5	Switch	6035	Maximum Performance Selector
M6	Centering Magnet	9722	
M7	Ion Trap	9702	
	Cabinet	7685	Model 7M112B (Mahogany)
	Cabinet	7686	Model 7B113B (Oak)
	Cabinet	7687	Model 7P114B (Cherry)
	Cabinet	7676	Model 21M121
	Cabinet	7677	Model 21B122
	Cabinet	7678	Model 21P123
	Cabinet	7682	Model 21M305B (Mahogany)
	Cabinet	7683	Model 21B306B (Oak)
	Cabinet	7684	Model 21P307B (Cherry)
	Cabinet	7697	Model 21M506 (Mahogany)
	Cabinet	7698	Model 21B507 (Oak)
	Cabinet	7699	Model 21P508 (Cherry)
	Back Cover	33587	Models 7M112B, 7B113B, 7P114B
	Back Cover	33592	Models 21M121, 21B122, 21P123
	Back Cover	33581	Models 21M305B, 21B306B, 21P307B
	Back Cover	33593	Models 21M506, 21B507, 21B508
	Safety Glass	772	Models 7M112B, 7B113B, 7P114B
	Safety Glass	769	Models 21M121, 21B122, 21P123, 21M305B, 21B306B, 21P307B, 21M506, 21B 507, and 21P508.
	Mask	3848	Models 7M112B, 7B113B, 7P114B
	Mask	3816	Models 21M121, 21B122, 21P123, 21M305B, 21B306B 21P307B, 21M506, 21B507, and 21P508.
	Antenna Assembly	99663	
	Cover, Front Control	33583	Models 7M112B, 7B113B, 7P114B
	Cover, Front Control	33584C	Models 21M121, 21B122, 21P123
	Cover, Front Control	33584	Models 21M305B, 21B306B, 21P307B, 21M506, 21B507, 21P508
	Knob	3866	Channel Selector, Models 7M112B, 7B113B, 7P114B, 21M121, 21B122, 21P123, 21M506, 21B507, 21P508.
	Knob	3866C	Channel Selector, Models 21M305B, 21B306B, 21P307B
	Knob	3867	Fine Tuning, Models 7M112B, 7B113B, 7P114B, 21M506, 21B507, 21P508.
	Knob	3867C	Fine Tuning, Models 21M305B, 21B306B, 21P307B.
	Knob	3864	Off-On Volume, Models 7M112B, 7B113B, 7P114B, 21M121, 21B122, 21P123, 21M506, 21B507, 21P508.
	Knob	3864C	Off-On Volume, Models 21M305B, 21B306B, 21P307B.
	Knob	3865	Contrast, Models 7M112B, 7B113B, 7P114B, 21M121, 21B122, 21P123, 21M506, 21B507, 21P508.
	Knob	3865C	Contrast, Models 21M305B, 21B306B, 21P307B.
	Knob	3813	Brightness
	Knob	3814	Vertical Hold
	Knob	3815	Horizontal Hold

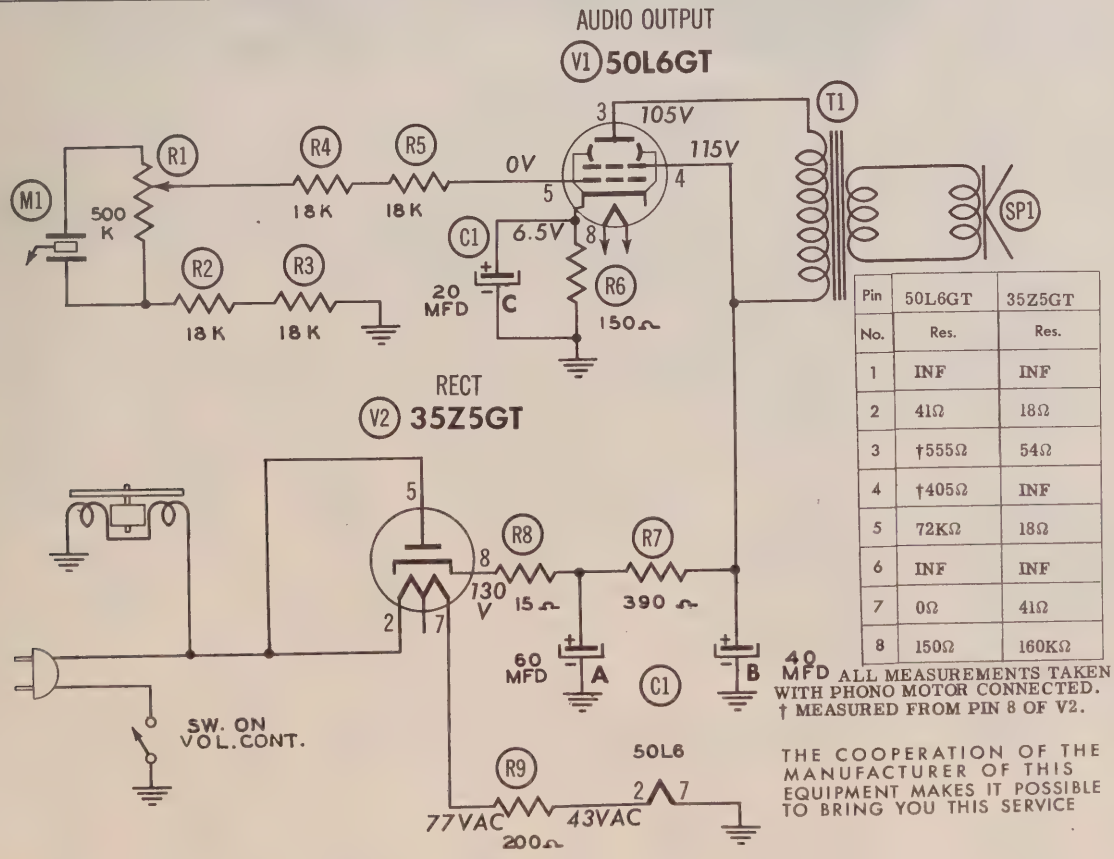


RF TUNER-BOTTOM VIEW



PROPERTY
E. F. BL
392

TRADE NAME	Hudson Electronics Models 11, 312H
MANUFACTURER	Hudson Electronics Corp., 110 E. Third St., Mt. Vernon, N.Y.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Manual Record Player
TUBES (Two)	Types 50L6GT or 50A5GT Audio Output, 35Z5GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING .21 Amp. @ 117 Volts AC



Pin No.	50L6GT Res.	35Z5GT Res.
1	INF	INF
2	41Ω	18Ω
3	†555Ω	54Ω
4	†405Ω	INF
5	72KΩ	18Ω
6	INF	INF
7	0Ω	41Ω
8	150Ω	160KΩ

ALL MEASUREMENTS TAKEN WITH PHONO MOTOR CONNECTED.
† MEASURED FROM PIN 8 OF V2.

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1953

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

HUDSON ELECTRONICS
MODELS 11, 312H

HUDSON ELECTRONICS
MODELS 11, 312H

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	INSTALLATION NOTES
		HUDSON PART No.	STANDARD REPLACEMENT		
V1A	Audio Output	50L6GT	50L6GT	7S	
B	Audio Output	50A5GT	50A5GT	6AA	
V2	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	HUDSON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■60	150		AFH3-81		C060		FP311	TVL-3430	
B	▲40	150								
C	20	25								

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	HUDSON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	BA012-051	Q13-133	AG-60-Z	B-60-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	HUDSON PART No.	IRC PART No.	
R2	18KΩ	½		BTS-18K	
R3	18KΩ	½		BTS-18K	
R4	18KΩ	½		BTS-18K	
R5	18KΩ	½		BTS-18K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	HUDSON PART No.	IRC PART No.	
R6	150Ω	½		BTS-150	
R7	390Ω	2		BTB-390	
R8	15Ω	⅛			
R9	200Ω	10		1 3/4A-200	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		HUSDON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T1	2.8KΩ	3.55Ω	150Ω	.4Ω		A-3332	A-3025	RO-2 ①	S-1X ①	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	HUDSON PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.55Ω		ST-113 Mod. P4-X	4A07	

PHONO CARTRIDGE

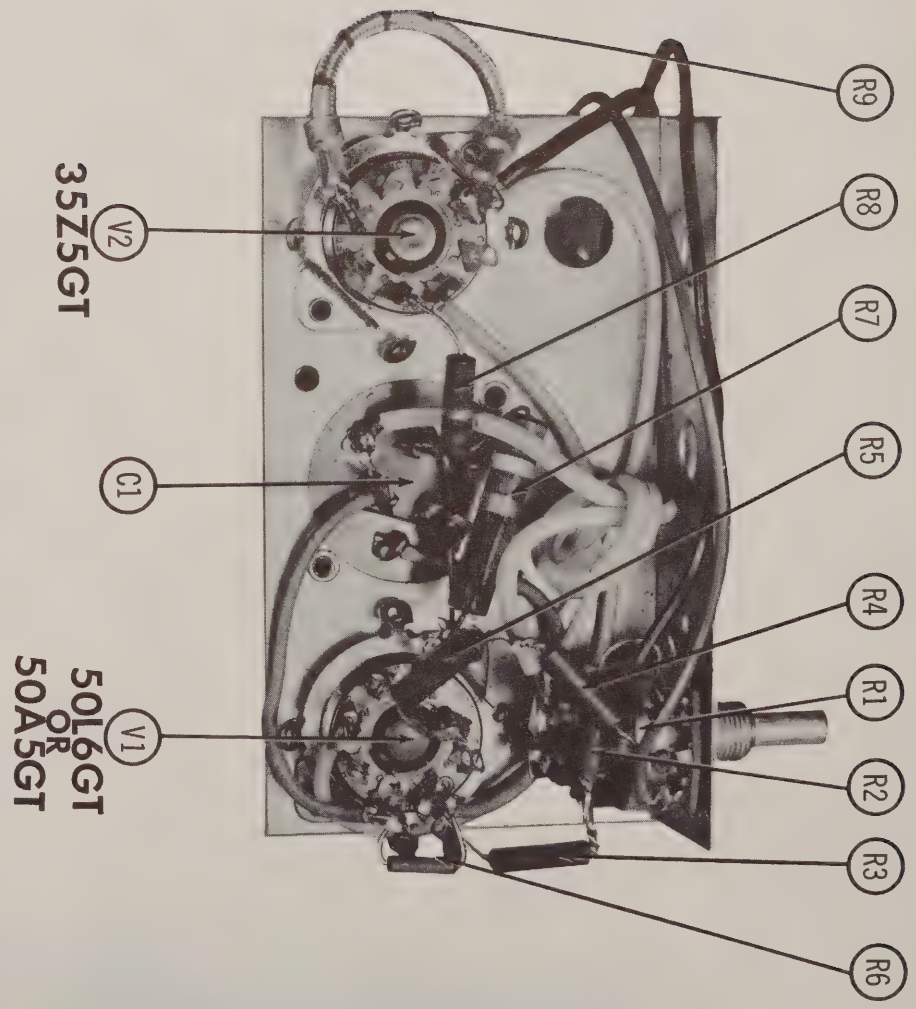
ITEM No.	REPLACEMENT DATA						REMARKS
	HUDSON PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1						*25H60		* Tone Arm

PHONO NEEDLE

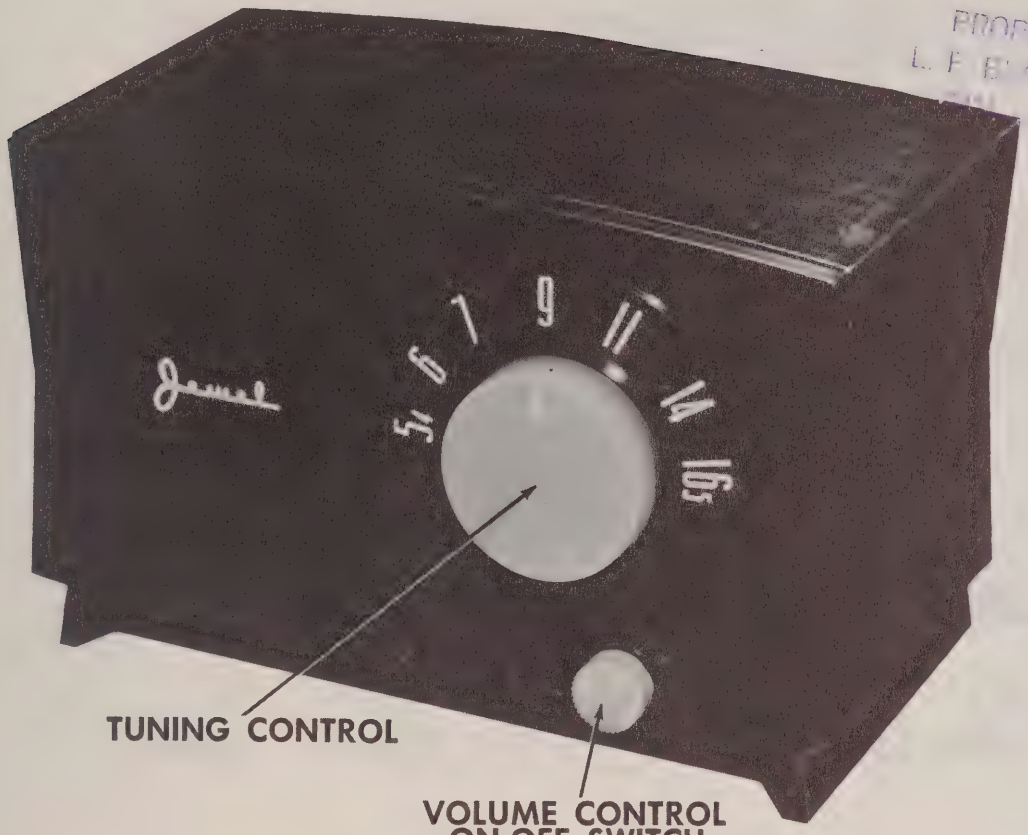
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	HUDSON PART No.	WALCO PART No.	JENSEN PART No.	
M2		W-14AGA	W-422	

CHASSIS—BOTTOM VIEW



PROPERTY OF
L. F. B[illegible]KENSHIP
[illegible] E ST
COLORADO



JEWEL
MODEL 5200

TRADE NAME	Jewel Model 5200
MANUFACTURER	Jewel Radio Corp., 900 Passaic Avenue, East Newark, New Jersey.
TYPE SET	AC/DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types: 12BE6 Conv., 12AU6 IF Amp., 12AV6 Det-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC/DC
RATING	.24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1650 KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to stator plates, front section of tuning gang. Low side to B+	455KC (400Ω Mod)	Tuning gang fully open.	Across voice coil.	A1, A2	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop.	1650KC	"	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1500KC	Tune to 1500KC signal.	"	A4	"

Replace receiver in cabinet, turn tuning gang fully closed and set pointer to "5" in 54.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	INSTALLATION NOTES
		JEWEL PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12AU6	12AU6	7BK	
V3	Det-AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	JEWEL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	40	150		PRS150/40-40		EDL4415		2N511	TVA-2445	Red
B	40	150								Blue
C2	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	120	500		1468-00015	D6-121	5W5T15	GP2K-121		1FM-315	
C4	4	500		1468-000005	TCZ-4.7	5W5V5	GP1K-050		1FM-55	
C5	250	500		1468-00025	D5-251	5W5T25	GP2K-251		1FM-325	
C6	.002	600		P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	
C7	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C8	100	500		1468-0001	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C9	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C10	.05	400		P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C11	.1	200		P3288-1	DF-104	PJ2P1		PT401	2TM-P1	

CONTROLS

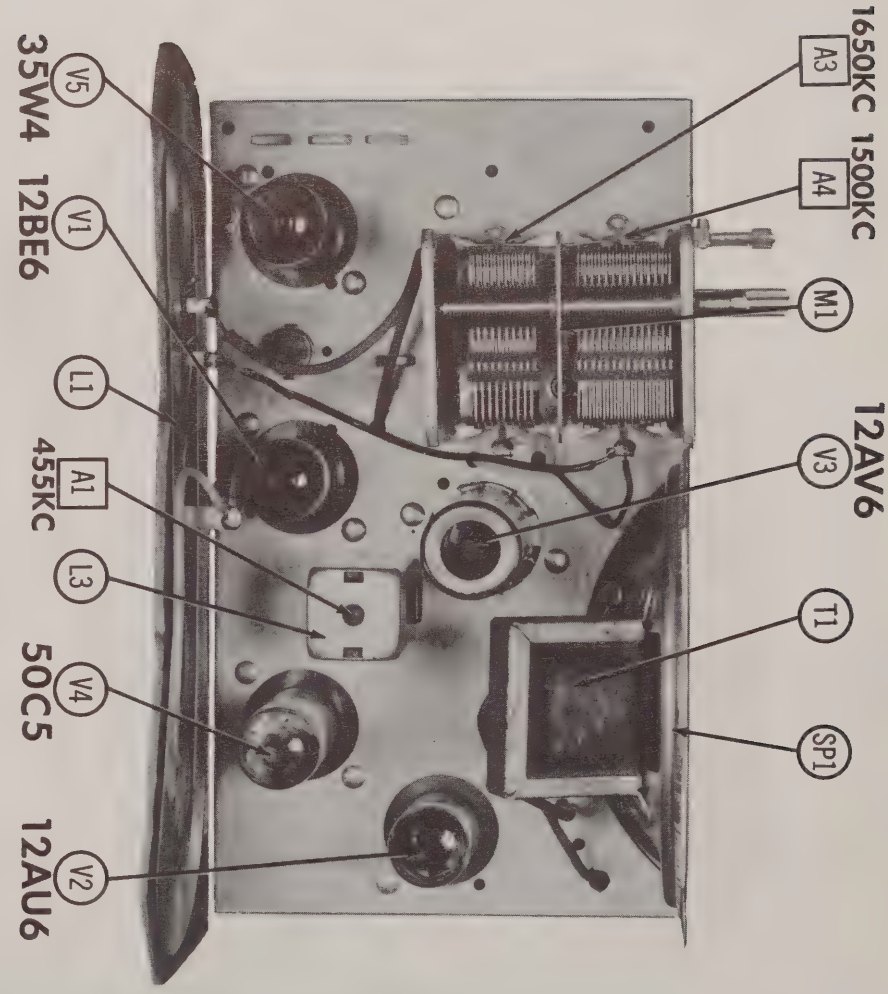
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	JEWEL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	2 Meg	½	50-11B	Q13-139	AG-66-Z	AB-76	U-55	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	KB-1	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	JEWEL PART No.	IRC PART No.	
R2	22KΩ	½		BTS-22K	
R3	10KΩ	½		BTS-10K	
R4	3.3Meg	½		BTS-3.3Meg	
R5	100KΩ	½		BTS-100K	
R6	10 Meg	½		BTS-10 Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	JEWEL PART No.	IRC PART No.	
R7	470KΩ	½		BTS-470K	
R8	330KΩ	½		BTS-330K	
R9	1500Ω	1		BTA-1500	
R10	22Ω	1½			

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		JEWEL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T1	2.26KΩ	3.4Ω	200Ω	.77Ω	Part of speaker	A-3332	A-3025	RO-2 ①	S-2X ①	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	JEWEL PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.4Ω	80-17	ST-113 Mod. P4-X	4A07	

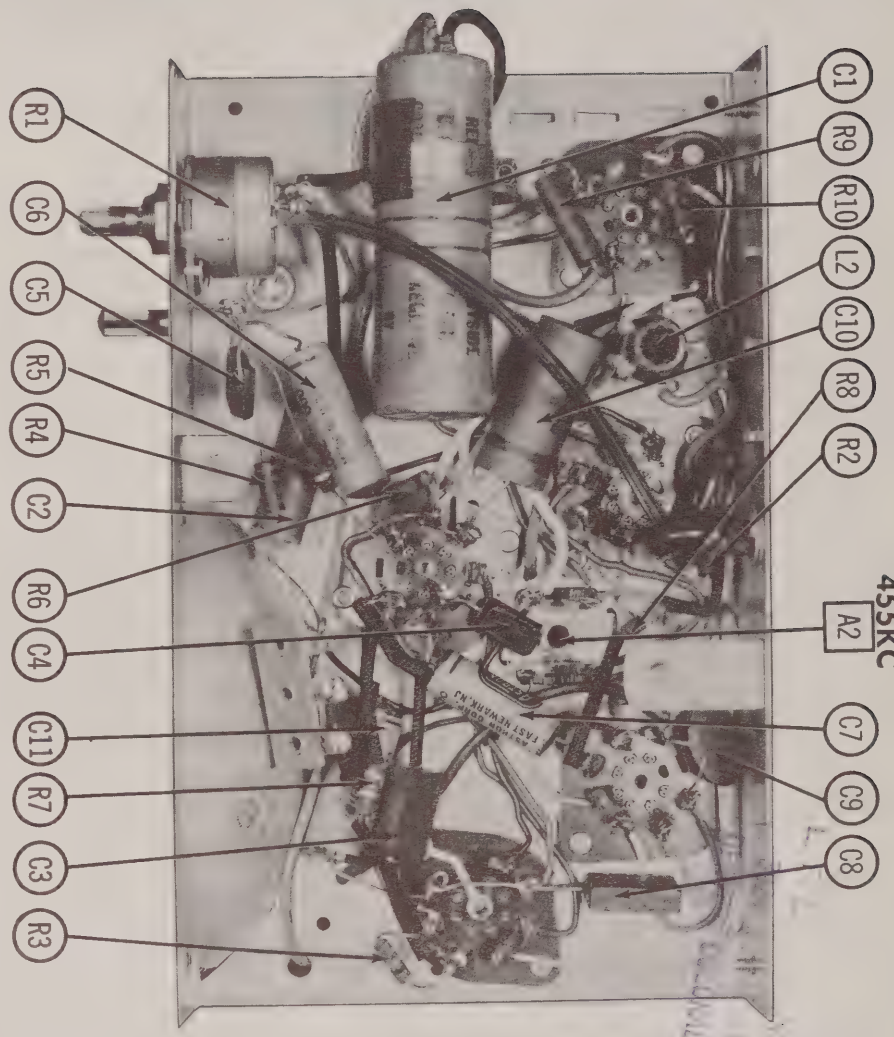
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	JEWEL PART No.	MERIT PART No.	IRC PART No.	
L1	Loop Ant.	0Ω	3Ω				
L2	Osc. Coil .	.4Ω	6Ω				
L3	IF Trans.	27Ω	26Ω	16-26			Pri. Tapped @ 26Ω

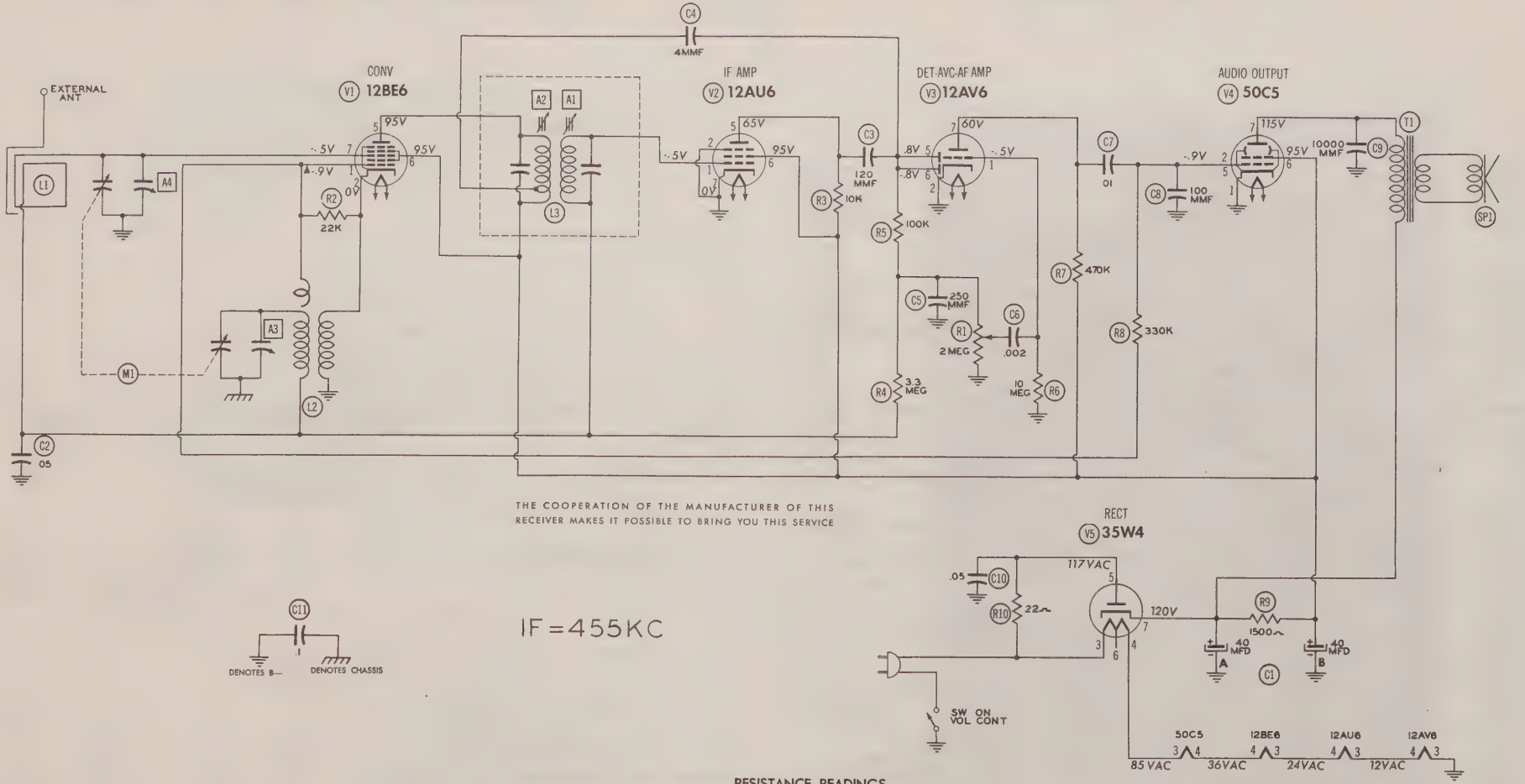
MISCELLANEOUS

ITEM No.	PART NAME	JEWEL PART No.	NOTES
M1	Tuning Capacitor		(28-460MMF, 32-190MMF)

CHASSIS—BOTTOM VIEW



JEWEL MODEL 5200



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.4Ω	24Ω	36Ω	† 1500Ω	† 1500Ω	5.3Meg
V 2	12AU6	5.3Meg	0Ω	12Ω	24Ω	† 11KΩ	† 1500Ω	0Ω
V 3	12AV6	10Meg	0Ω	0Ω	12Ω	2.1Meg	2.1Meg	† 470KΩ
V 4	50C5	0Ω	350KΩ	85Ω	36Ω	350KΩ	† 1500Ω	† 200Ω
V 5	35W4	500KΩ	INF	120Ω	85Ω	145Ω	90Ω	500KΩ

▲ TAKEN WITH VACUUM TUBE VOLTMETER.
† TAKEN FROM PIN 7 OF V5.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1953

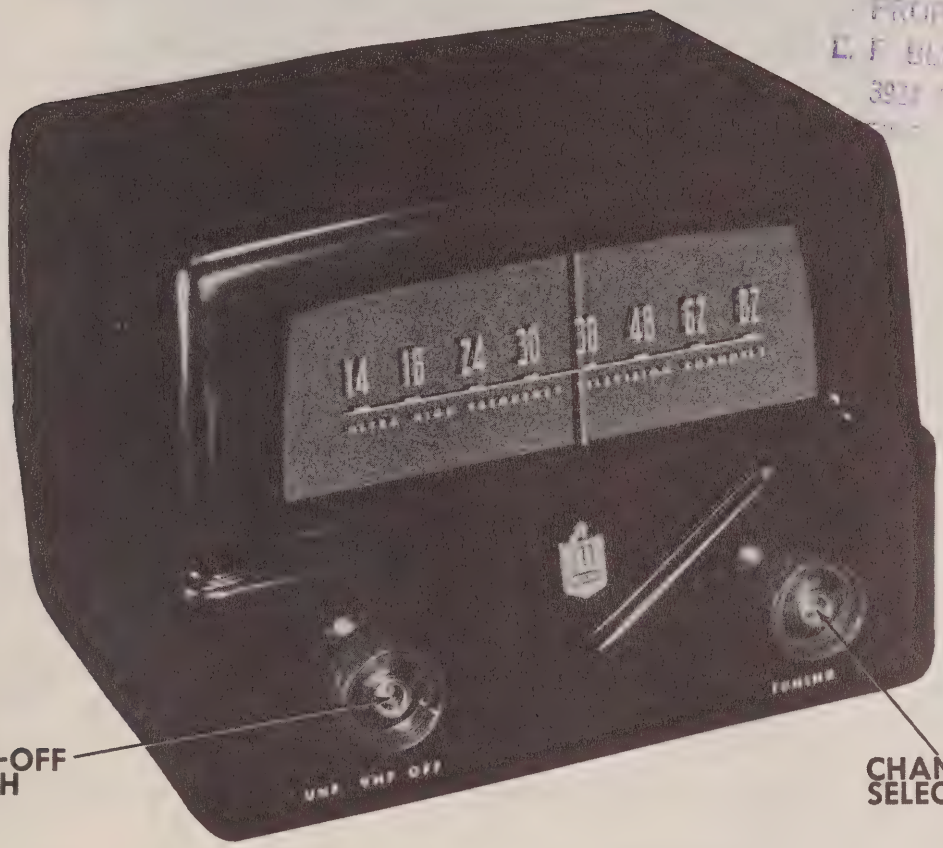
194-6

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

MALLORY MODEL
TV-101 (Below Serial No. 200,000)

PROPERTY OF
L. F. SLANKENSHIP

MALLORY MODEL
TV-101 (Below Serial No. 200,000)



MALLORY MODEL
TV-101 (Below Serial No. 200,000)

TRADE NAME	Mallory TV-101 (Early- Below Serial No. 200,000)
MANUFACTURER	P.R. Mallory Co. Inc., 3029 E. Washington St., Indianapolis, Indiana
TYPE SET	AC Operated All Channel UHF Converter
TUBES (THREE)	Types 6AF4 RF Osc., 6BQ7 or 6BK7 IF Amp., 6X4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	.24 Amp. @ 117 Volts AC
TUNING RANGE	Channels 14 thru 83

THIS CONVERTER HAS BEEN PROPERLY ALIGNED AT THE FACTORY AND IS VERY STABLE. ALIGNMENT SHOULD NOT BE ATTEMPTED IN THE FIELD.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	INSTALLATION NOTES
		MALLORY PART No.	STANDARD REPLACEMENT		
V1	RF Oscillator	6AF4	6AF4	7DK	
V2A	IF Amplifier	6BQ7	6BQ7	9AJ	
B	IF Amplifier	6BK7	6BK7	9AJ	
V3	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MALLORY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■20	200		AFH3-17				FP318.5		
B	▲20	175								
C	20	150								
C2	.68				TCZ-.68		NPOK-R68			
C3	.68				TCZ-.68		NPOK-R68			
C4	.8-6.5									
C5	1				TCZ-1		NPOK-010		5TCCB-V1	
C6	1.2						NPOK-1R2			
C7	.8-6.5									
C8	1				TCZ-1		NPOK-010		5TCCB-V1	
C9	2.2				TCZ-2.2		NPOK-2R2		5TCCB-V22	
C10	1				TCZ-1		NPOK-010		5TCCB-V1	
C11	.68				TCZ-.68		NPOK-R68			
C12	3-10									
C13	10									
C14	68			SI68	D6-680		GP1K-680	UC-5468	5GA-Q68	
C15	68			SI68	D6-680		GP1K-680	UC-5468	5GA-Q68	
C16	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C17	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C18	100			SI100N750	DD-103		N750L-101	NT-531	5TCU-T1	
C19	1000			BPD-001	DD-103	TM5D1	801-001	DC-521	5HK-D1	
C20	1000			BPD-001	DD-103	TM5D1	801-001	DC-521	5HK-D1	
C21	1000			BPD-001	DD-103	TM5D1	800-001	DC-521	5HK-D1	
C22	1000			BPD-001	DD-103	TM5D1	801-001	DC-521	5HK-D1	
C23	1000			BPD-001	DD-103	TM5D1	801-001	DC-521	5HK-D1	

RESISTORS

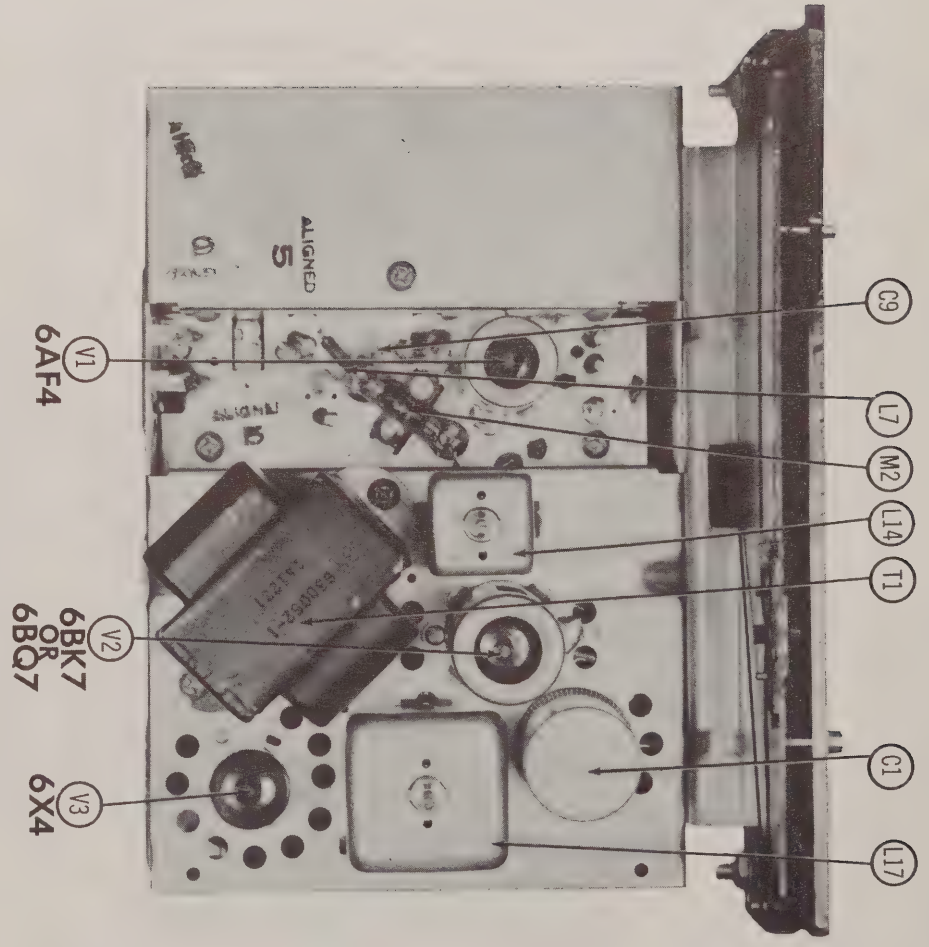
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MALLORY PART No.	IRC PART No.	
R1	22Ω	½			
R2	22Ω	½			
R3	56Ω	½			
R4	470Ω	½		BTS-470	
R5	56Ω	½			
R6	470Ω	½		BTS-470	
R7	15KΩ	½		BTS-15K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MALLORY PART No.	IRC PART No.	
R8	12KΩ	½		BTS-12K	
R9	6800Ω	1		BTA-6800	
R10	6800Ω	1		BTA-6800	
R11	680Ω	2		BTB-680	
R12	680Ω	2		BTB-680	
R13	470Ω	½		BTS-470	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	MALLORY PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117 V ⓐ .24A	180V .037ADC	6.3V ⓐ 1.3A		630052-1				

CHASSIS—TOP VIEW



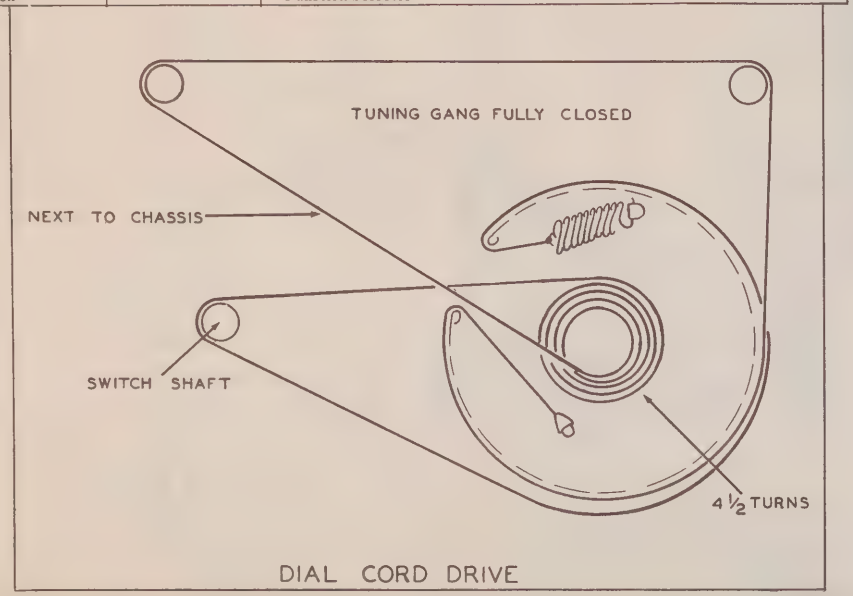
PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MALLORY PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA IRC PART No.	NOTES
L1	UHF Ant. Coil	.2Ω					
L2	UHF Ant. Coil	.2Ω					
L3	UHF Pre-Selector, Mixer & Osc. Coils	0Ω					
L4	UHF Pre-Selector Coil End Inductor	0Ω					
L5	UHF Mixer Coil End Inductor	0Ω					
L6	Parasitic Choke	0Ω					
L7	UHF Osc. Coil End Inductor	0Ω					
L8	Cathode Choke	.1Ω					
L9	Fil. Choke	.3Ω					
L10	Fil. Choke	.3Ω					
L11	Fil. Choke	.3Ω					
L12	RF Choke	.1Ω					
L13	Parasitic Choke	0Ω					
L14	UHF IF Trans.	.1Ω	.1Ω				
L15	RF Choke	.3Ω					
L16	RF Choke	.1Ω					
L17	UHF IF Output Trans.	.2Ω	.2Ω				

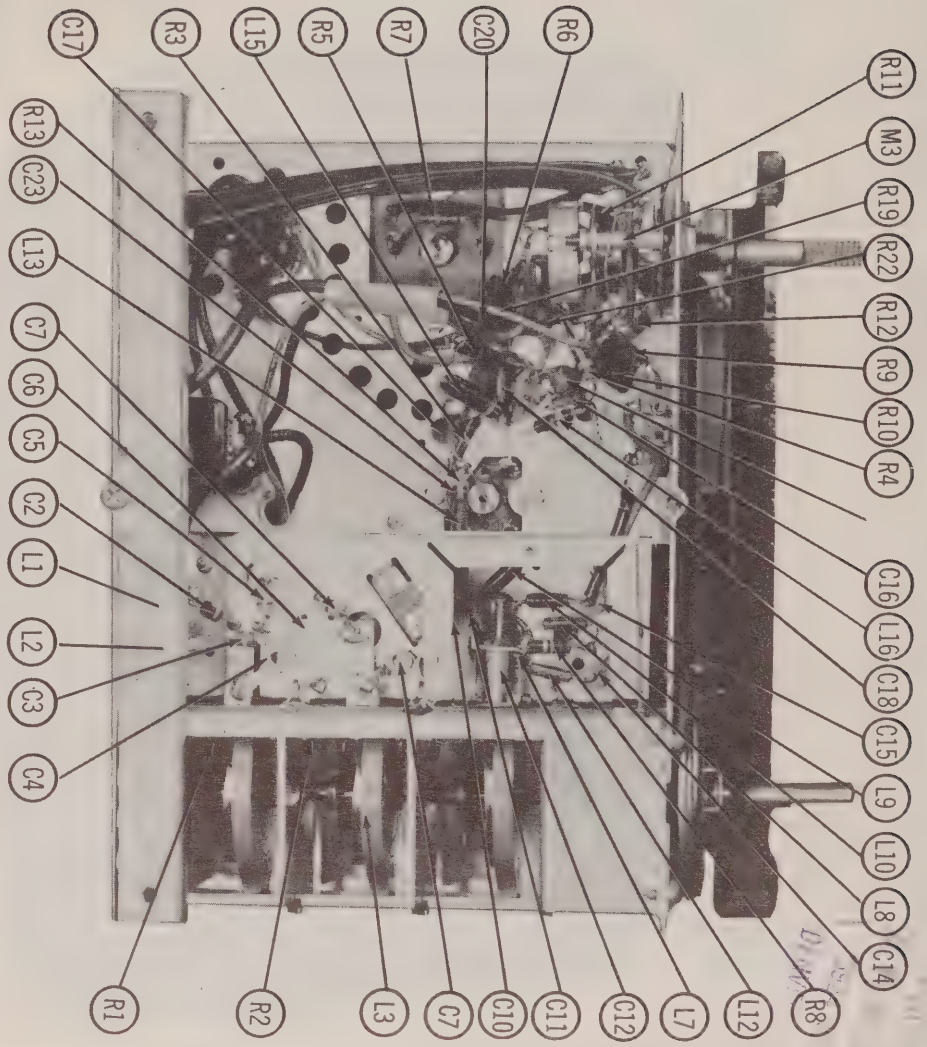
MISCELLANEOUS

ITEM No.	PART NAME	MALLORY PART No.	NOTES
M1	Tuning Assembly		
M2	Crystal Diode		Mixer
M3	Switch		Function Selector

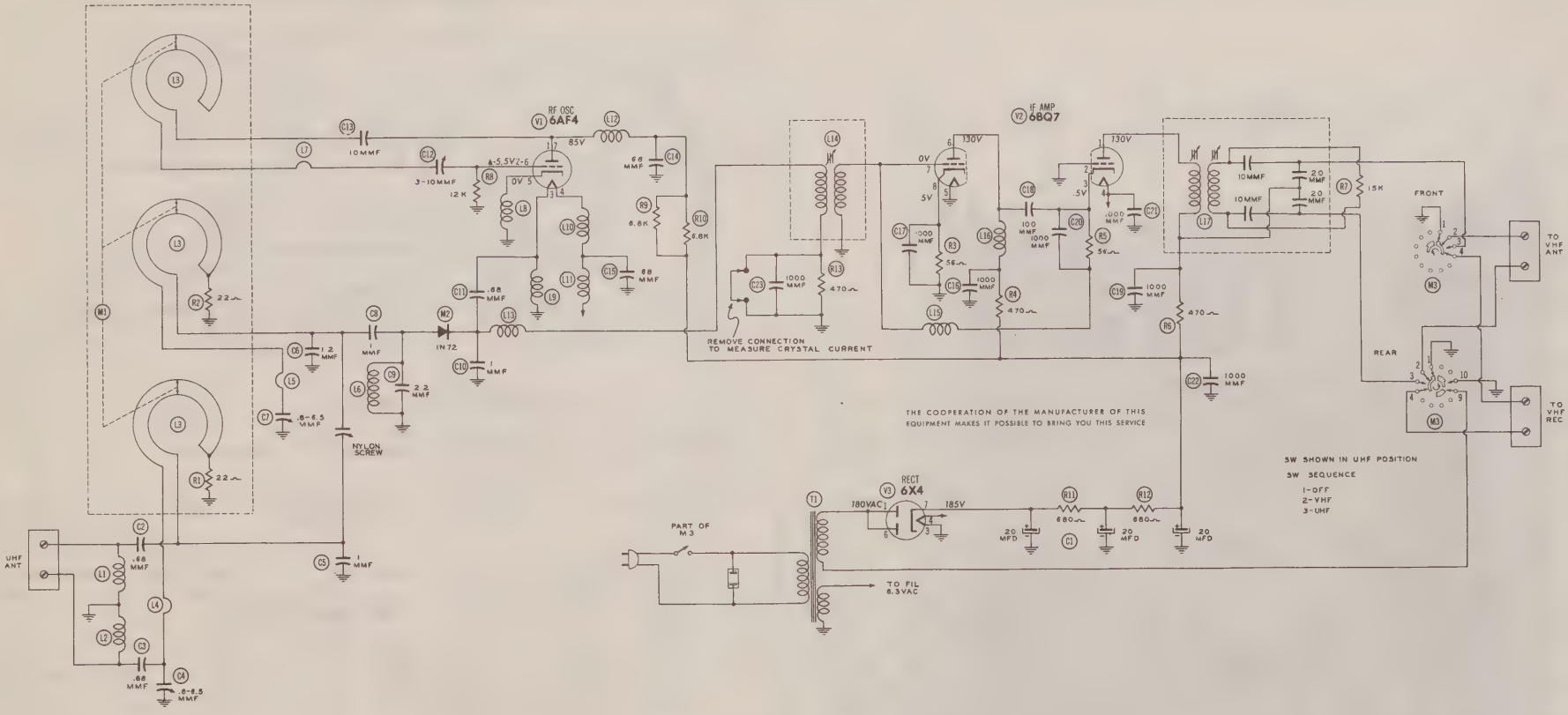


DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



MALLORY MODEL TV-101 (EARLY)



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4	†4.8KΩ	12KΩ	.3Ω	.7Ω	.1Ω	12KΩ	†4.8KΩ		
V 2	6BQ7	†1.8KΩ	0Ω	56Ω	.2Ω	0Ω	†1.8KΩ	.1Ω	56Ω	0Ω
V 3	6X4	150Ω	∞INF	0Ω	.2Ω	INF	150Ω	350KΩ		

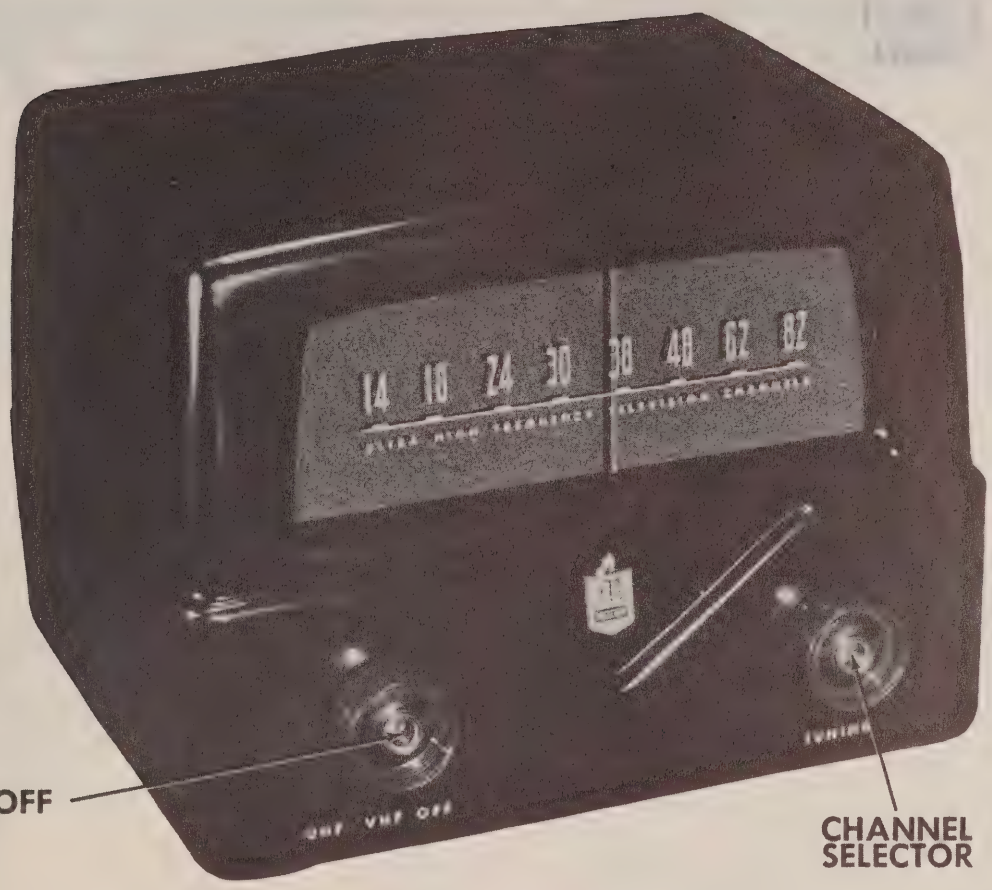
▲ TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM PIN 7 OF V3
SELECTOR SWITCH (M3) IN UHF POSITION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1953

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

MALLORY MODEL
TV-101 (Serial No. 200,000 & Above)

MALLORY MODEL
TV-101 (Serial No. 200,000 & Above)



UHF-VHF-OFF SWITCH

CHANNEL SELECTOR

MALLORY MODEL
TV-101 (Serial No. 200,000 & Above)

TRADE NAME	Mallory TV-101 (Late - Above Serial No. 200,000)
MANUFACTURER	P. R. Mallory Co., Inc., 3029 E. Washington St., Indianapolis, Indiana
TYPE SET	AC Operated All Channel UHF Converter
TUBES (Two)	Types: 6AF4 RF Osc., 6CB6 IF Amp.
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING .14 Amp. @ 117 Volts AC
TUNING RANGE	Channels 14 Thru 83

THIS CONVERTER HAS BEEN PROPERLY ALIGNED AT THE FACTORY AND IS VERY STABLE. ALIGNMENT SHOULD NOT BE ATTEMPTED IN THE FIELD.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

MALLORY
MODEL TV-101 (LATE)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	INSTALLATION NOTES
		MALLORY PART No.	STANDARD REPLACEMENT		
V1	RF Oscillator	6AF4	6AF4	7DK	
V2	IF Amplifier	6CB6	6CB6	7CM	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MALLORY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■30	150		AFH2-11		B011		FP211	TVL-2422	
B	▲30	150								
C2	1				TCZ-1		NP0K-010		5TCCB-V1	
C3	1				TCZ-1		NP0K-010		5TCCB-V1	
C4	1				TCZ-1		NP0K-010		5TCCB-V1	
C5	.8-6.5									
C6	.4									
C7	.25									
C8	.8-6.5									
C9	1.5			SIL.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C10	2									
C11	.68				TCA-.68		NP0K-R68			
C12	3-10									
C13	10									
C14	68			SI68	D6-680		GP1K-680	UC-5468	5GA-Q68	
C15	68			SI68	D6-680		GP1K-680	UC-5468	5GA-Q68	
C16	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C17	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C18	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C19	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C20	10			SI10	D6-100		GP1K-100	UC-541	5GA-Q1	
C21	10			SI10	D6-100		GP1K-100	UC-541	5GA-Q1	
C22	20			SI20	D6-200		GP1K-200	UC-542	5GA-Q2	
C23	20			SI20	D6-200		GP1K-200	UC-542	5GA-Q2	
C24	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	

RESISTORS

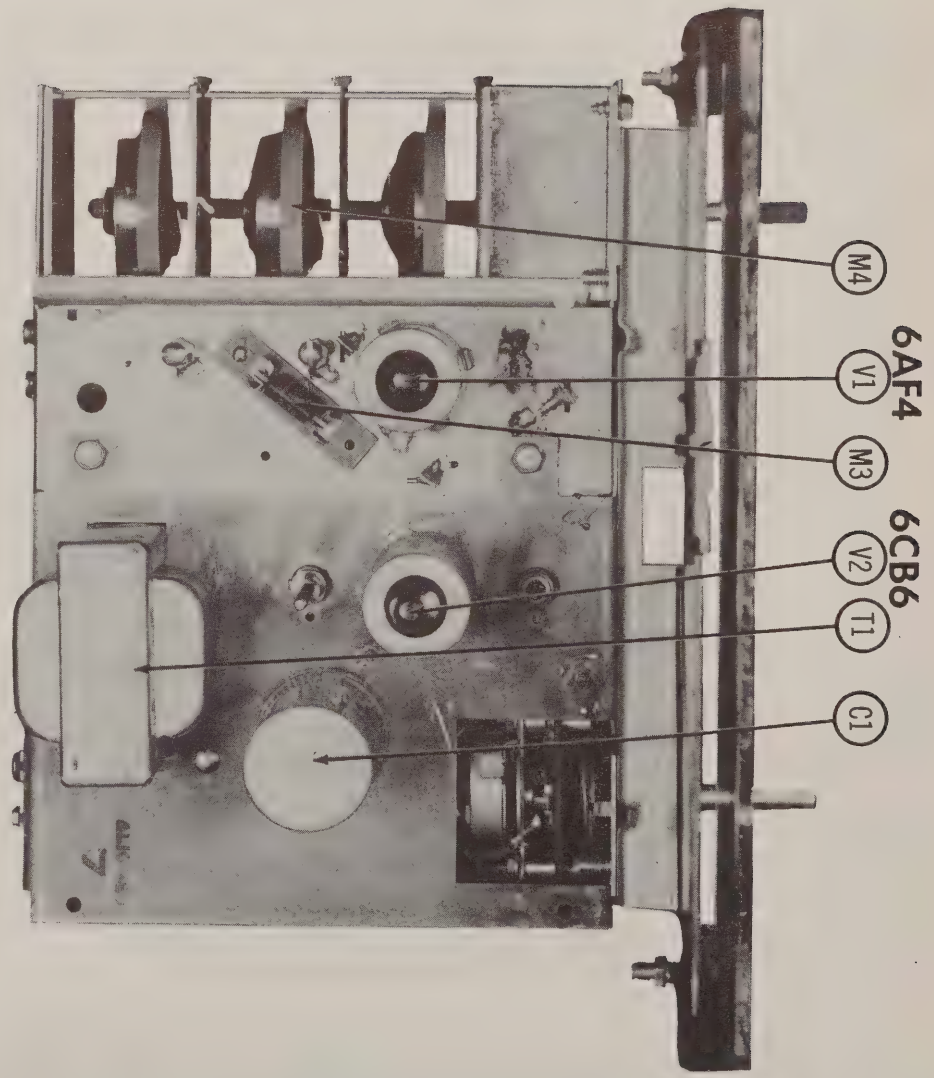
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MALLORY PART No.	IRC PART No.	
R1	1500Ω	1/2		BTS-1500	
R2	1500Ω	1/2		BTS-1500	
R3	22Ω	1/2			
R4	22Ω	1/2			

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MALLORY PART No.	IRC PART No.	
R5	12KΩ	1/2		BTS-12K	
R6	470Ω	1/2		BTS-470	
R7	150Ω	1/2		BTS-150	
R8	1200Ω	1		BTA-1200	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	MALLORY PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117V @ .14A	117V .020ADC	6.3V @ .53A		B-630124-1				

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MALLORY PART No.	REPLACEMENT DATA MERIT PART No.	NOTES
L1	UHF Pre-Selector, Mixer & Osc. Coils	0Ω				
L2	UHF Pre-Selector Coil End Inductor	0Ω				
L3	UHF Mixer Coil End Inductor	0Ω				
L4	UHF Osc. Coil End Inductor	0Ω				
L5	RF Choke	.1Ω				.38 Microhenry
L6	Cathode Choke	.1Ω				.38 Microhenry
L7	Fil. Choke	.				
L8	Fil. Choke	.1Ω				
L9	UHF IF Input Trans.	0Ω	0Ω			
L10	RF Choke	.1Ω				
L11	UHF IF Output Trans.	0Ω	0Ω			
L12	RF Choke	0Ω				

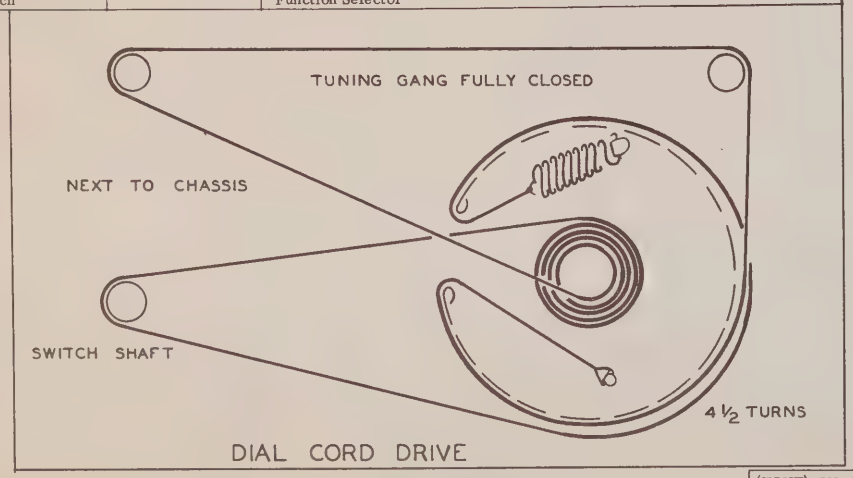
SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA MALLORY PART No.	SYLVANIA PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.
M1	.020 Amp.			8Y1 ①	1214	6S35	35

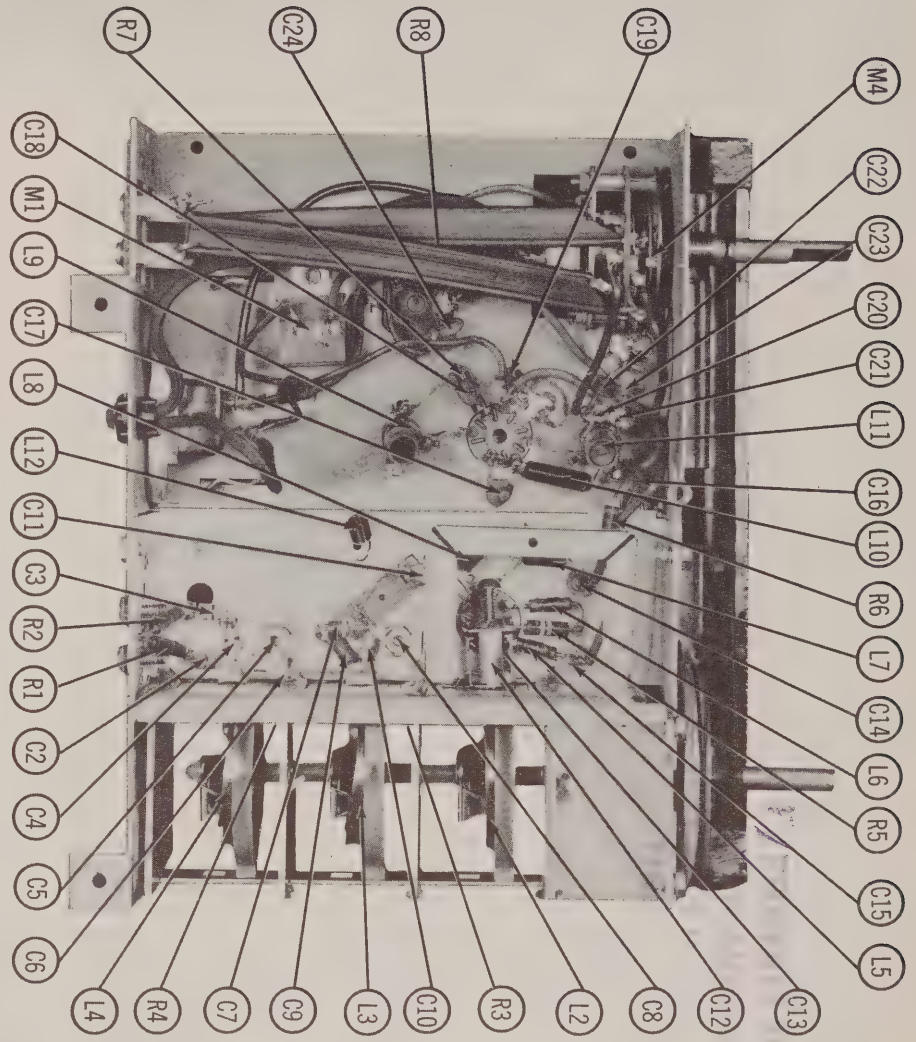
① Fabricate Mounting Bracket

MISCELLANEOUS

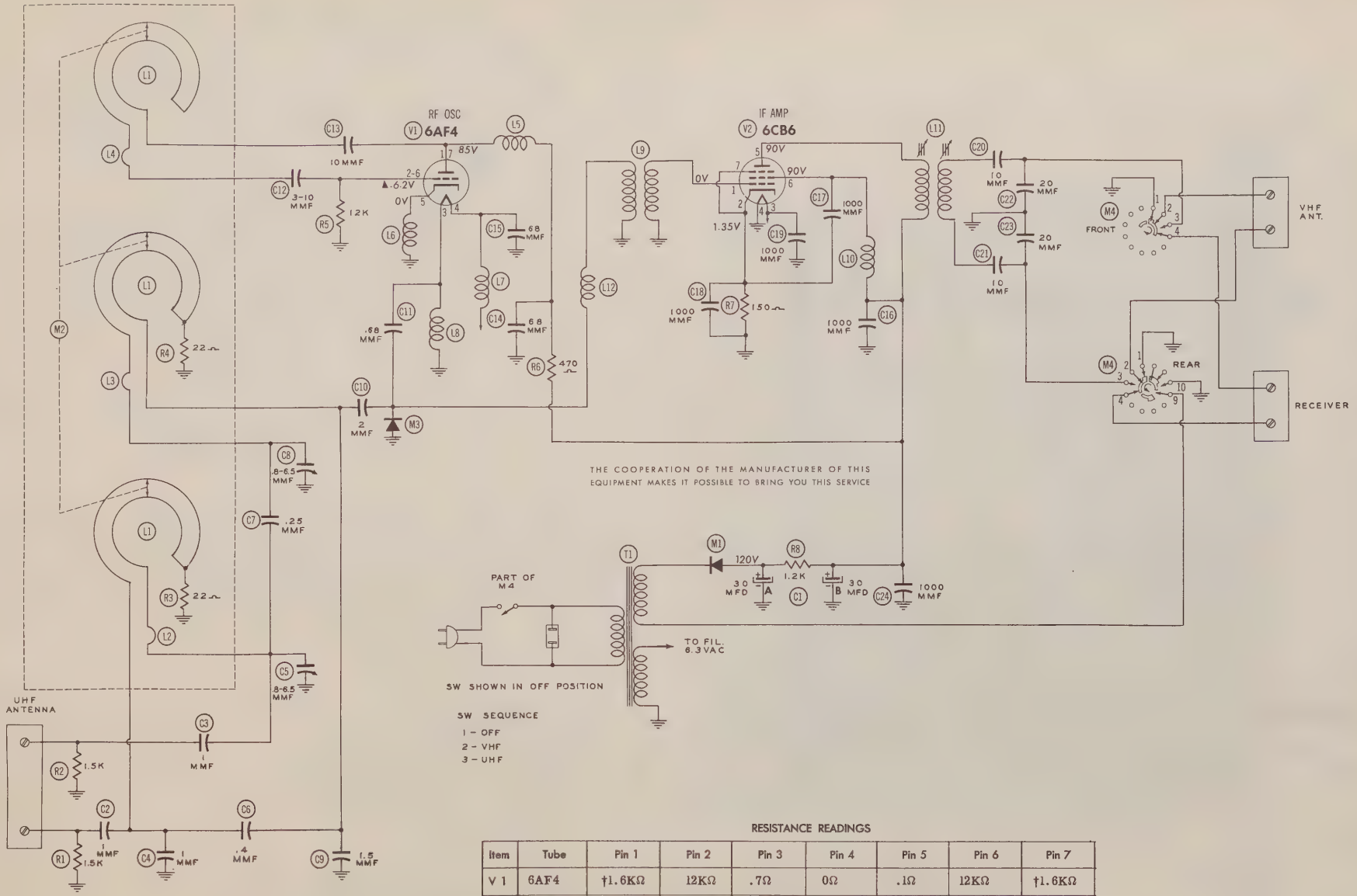
ITEM No.	PART NAME	MALLORY PART No.	NOTES
M2	Tuning Assembly		
M3	Crystal		Mixer
M4	Switch		Function Selector



CHASSIS—BOTTOM VIEW



MALLORY MODEL TV-101 (LATE)



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6AF4	†1.6KΩ	12KΩ	.7Ω	0Ω	.1Ω	12KΩ	†1.6KΩ
V 2	6CB6	0Ω	150Ω	.7Ω	0Ω	†1.2KΩ	†1.2KΩ	150Ω

▲ TAKEN WITH VACUUM TUBE VOLTMETER.
† MEASURED FROM OUTPUT OF M1.
READINGS TAKEN WITH FUNCTION SWITCH IS UHF POSITION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1953

194-8

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

MOTOROLA MODELS 17T11E (Ch. TS-400A), 17T13, (Ch. TS-410A)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MODEL 17T11E

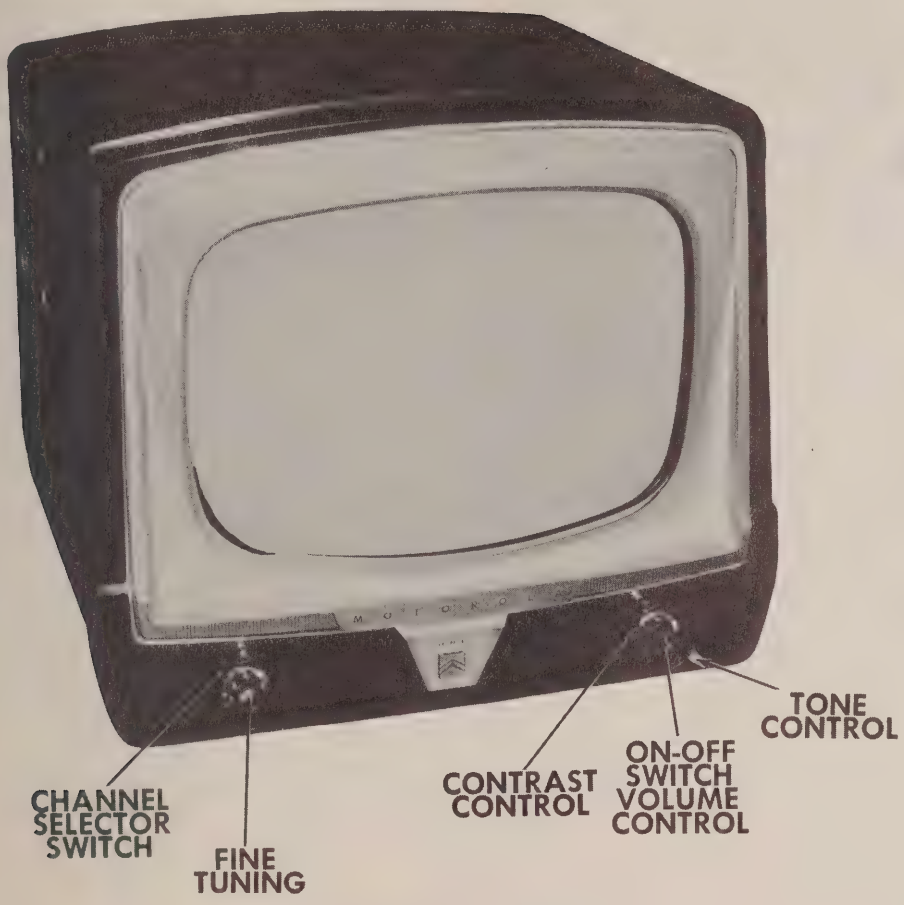
MOTOROLA MODELS 17T11E
(Ch. TS-400A), 17T13, (Ch. TS-410A)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 2-53 SET 194 FOLDER 9

MOTOROLA MODELS 17T11E (Ch. TS-400A), 17T13, (Ch. TS-410A)



MOTOROLA MODEL 17T11E

TRADE NAME	Motorola Models 17T11E (Ch. TS-400A), 17T13 (Ch. TS-410A)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago, Ill.
TYPE SET	Television Receiver
TUBES	Seventeen
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.2 Amp. @ 117 Volts AC
TUNING RANGE—	Channels 2 thru 13

INDEX

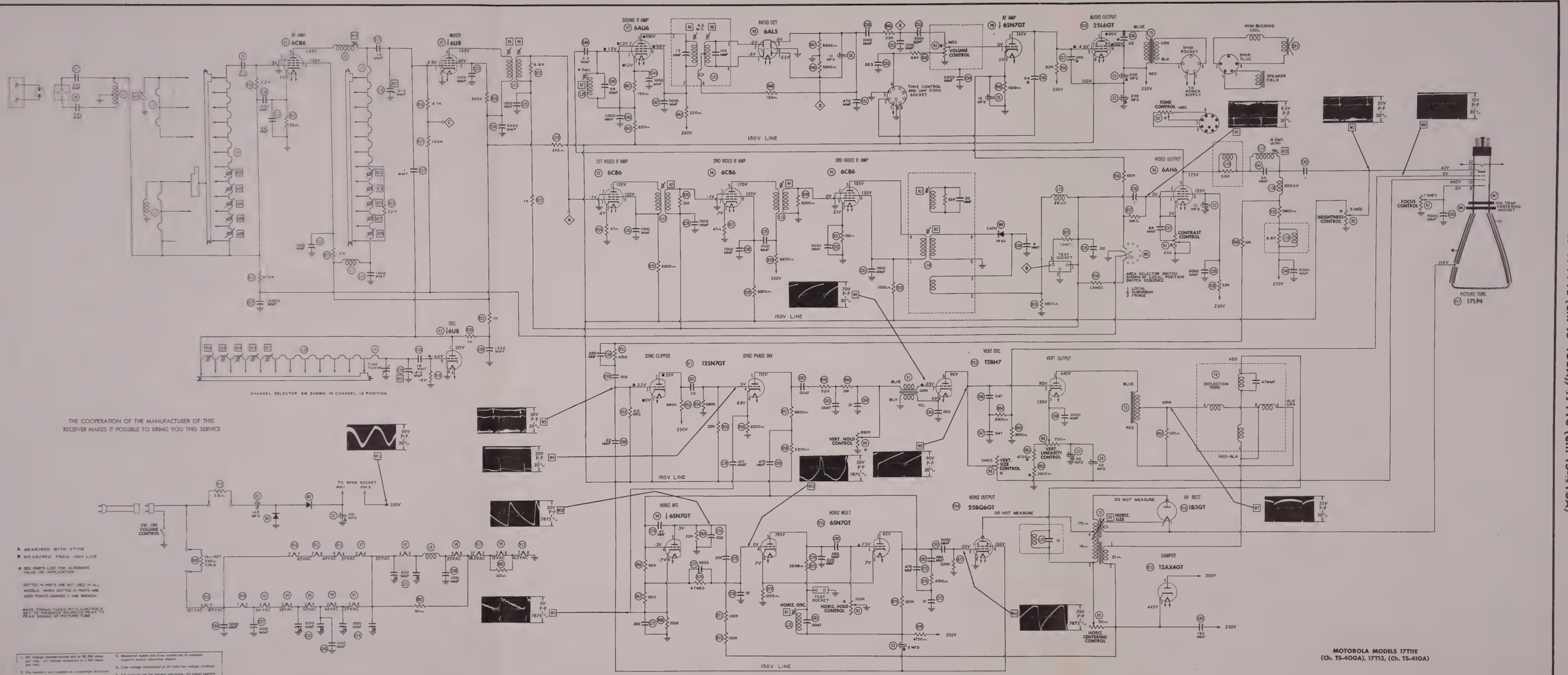
Alignment Instructions 6, 7
Disassembly Instructions 10
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions 12, 13, 14
Photographs
Cabinet - Rear View 11
Capacitor and Alignment Identification 4, 9
Chassis - Top View 3
RF Tuner 14
Photographs (Cont)
Resistor and Inductor Identification 15, 16
Resistance Measurements 8
Schematic 2
Servicing in the Field 10
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

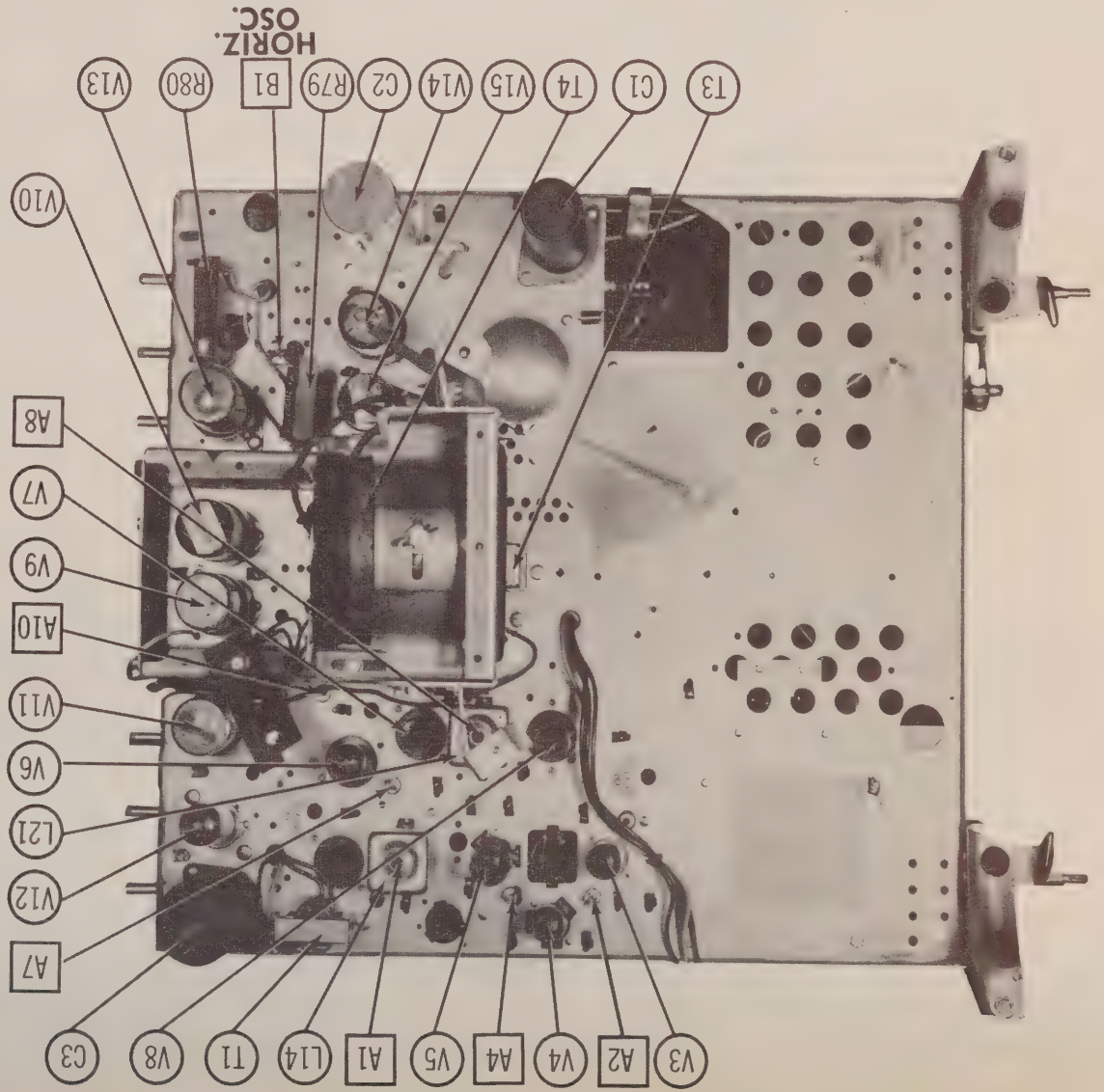
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

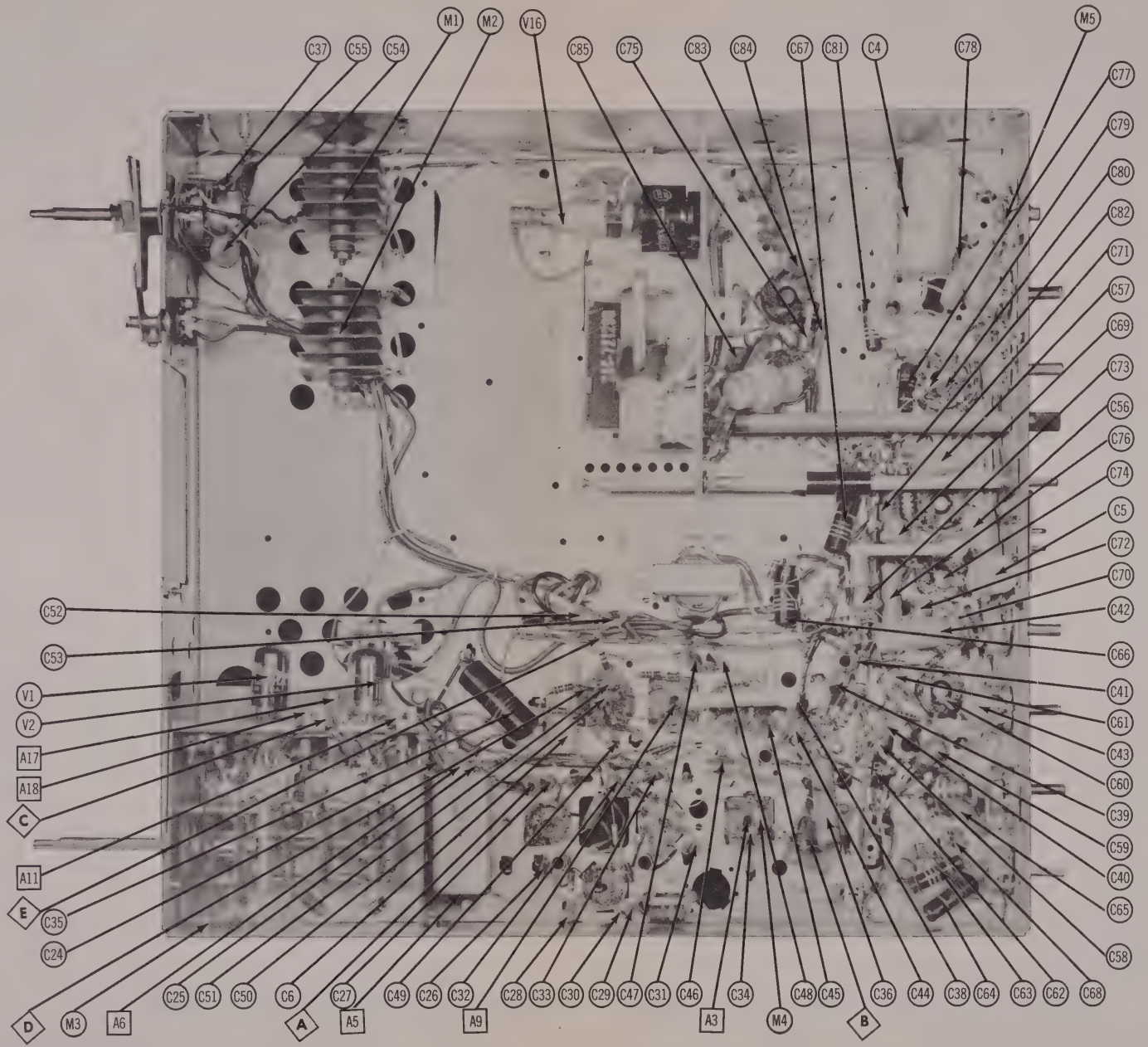
DATE 2-53 SET 194 FOLDER 9

MOTOROLA MODELS 17T11E (Ch. TS-400A), 17T13, (Ch. TS-410A)


MOTOROLA
MODELS 17T11E (Ch. TS-400A), 17T13 (Ch. TS-410A)
MOTOROLA MODELS 17T11E
(Ch. TS-400A), 17T13, (Ch. TS-410A)
THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
CHANNEL SELECTOR SW SHOWN IN CHANNEL 13 POSITION
150V LINE
SW. ON VOLUME CONTROL
TO SPKR SOCKET PIN 1
TO SPKR SOCKET PIN 5
▲ MEASURED WITH VTVM
■ MEASURED FROM 150V LINE
● SEE PARTS LIST FOR ALTERNATE VALUE ON APPLICATION
DOTTED 'A' PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED 'A' PARTS ARE USED POINTS MARKED X ARE BROKEN.
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE SQUARE PEAK TO PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements are at 20,000 ohms per volt, AC voltage measured at 1,000 ohms per volt.
2. Measured values are from socket pin to common negative unless otherwise stated.
3. Pin numbers are counted in a clockwise direction as bottom of socket.
4. Line voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation; No signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1953

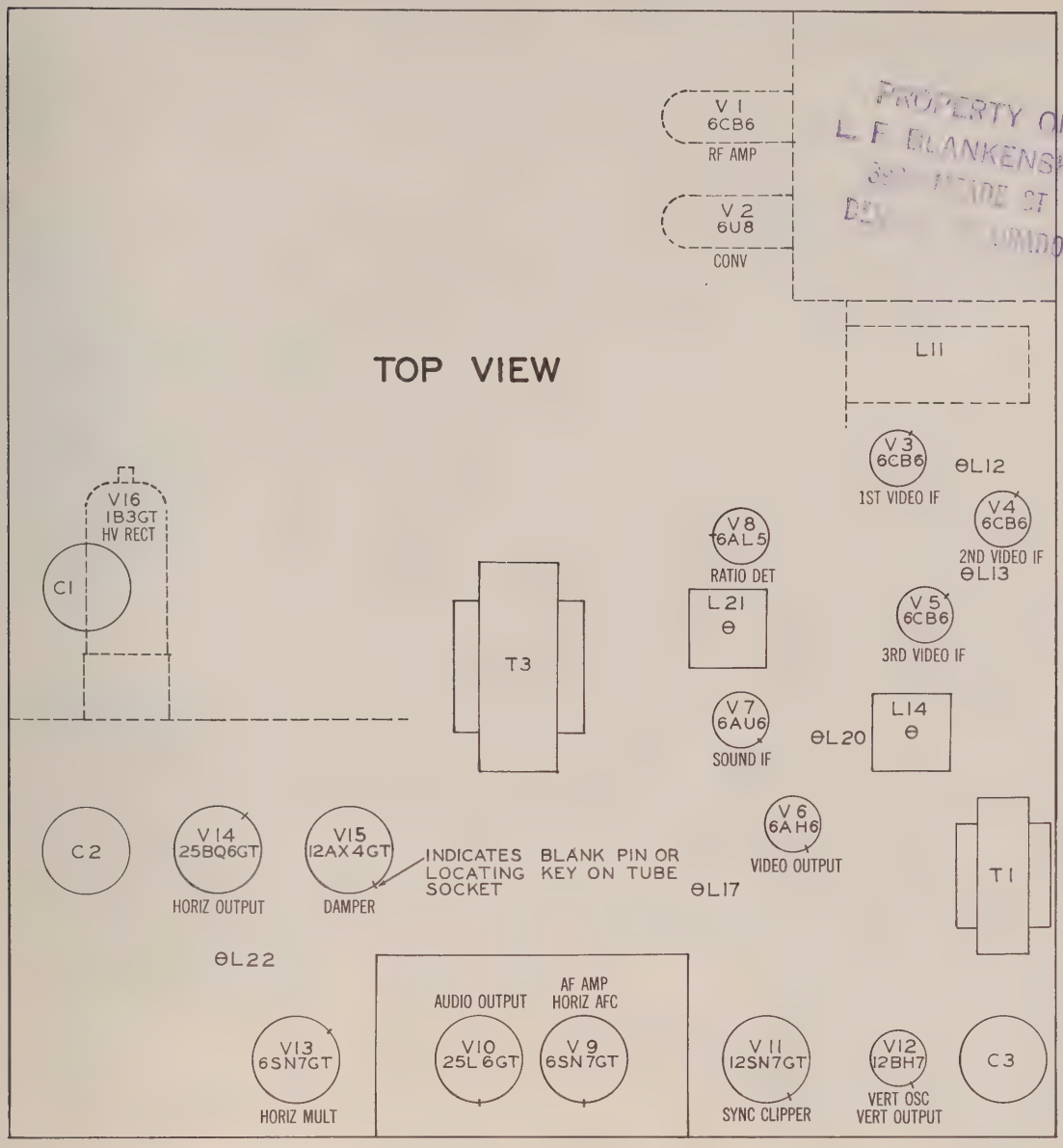
CHASSIS TOP VIEW





CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



PROPERTY OF
L. F. BLANKENSHIP

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1, M2)

LOSS PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V10
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V17
Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE
No vert. sync - V11, V12
No horiz. sync - V9, V11, V13
No vert. or horiz. sync - V11

SWEEP FAILURE
No raster, has sound - V13, V14, V15, V16, V17
No vertical deflection - V12
Poor vert. linearity or foldover - V12
Poor horiz. linearity or foldover - V13, V14, V15
Narrow picture - V13, V14, V15, V16, M1, M2
Vert. off freq. - V11, V12
Horiz. off freq. - V9, V11, V13

NOTE: Since this receiver employs tubes used in a series - parallel filament network, an open filament in any tube in series may cause the set to be inoperative.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal output tube (V14).
The possibility of RF interference from V14 during alignment is also eliminated by this procedure.
Replace the tube with an 80 ohm, 10 watt resistor across pins 2 and 7 of V14 socket, or use same type tube with all pins clipped off except the heater pins.
Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Connect the negative side of a 3 volt battery through 47KΩ to pin 1 of the test receptacle on the IF strip. Connect the positive lead to chassis.
Turn area selector switch to LOCAL position.
If a distorted or unstable response curve is seen on the scope during alignment it may be necessary to disable the local oscillator by shorting across the oscillator inductance (position 2 to position 13 on the band switch).

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to point (A). Low side to chassis.	24.6MC (10MC Swp)	21.9MC	Non interfering Channel	Vert. Amp. thru 47KΩ to point (B). Low side to chassis.	A1	Adjust for MINIMUM response at 21.9MC.
2.	"	"	"	26.6MC	"	"	A2, A3	Adjust A2 to place 26.6MC marker on the high side of response curve 50% down from maximum response as in Fig. 1. Adjust A3 for flat-top, symmetrical response. Attenuate generator to maintain 1 to 1.5V DC at point (B).
3.	"	"	"	22.9MC	"	"	A4, A3	Adjust A4 to place 22.9MC on the low side of response curve 50% down from maximum response as in Fig. 1. Adjust A3 for a flat-top symmetrical response.
4.	"	High side to point (C). Low side to chassis.	"	22.9MC 26.4MC	"	"	A5, A6	Short out R16. Adjust A5 and A6 for response similar to Fig. 2. Make sure slugs are tuned away from center of coil.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Set contrast control at maximum contrast position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.005MFD	High side to pin 1 (grid) of 6AH6 (V6). Low side to chassis.	4.5MC (Unmod)	Non Interfering channel.	DC probe to point (A). Common to chassis.	A7, A8	Adjust for maximum deflection.
6.	"	"	"	"	DC probe to point (E). Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Set contrast control at maximum contrast position.
Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	.005MFD	High side to pin 1 (grid) of 6AH6 (V6). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Non interfering channel.	Vert. amp to point (D) Low side to chassis.	A7, A8	Disconnect stabilizer capacitor C6. Adjust for curve of maximum amplitude and symmetry as inFig. 3.
6.	"	"	"	"	"	Vert. amp to point (E) Low side to chassis.	A9	Reconnect capacitor C6. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 4. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

Set contrast control at maximum contrast position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.005MFD	High side to pin 1 (grid) of 6AH6 (V6). Low side to chassis.	4.5MC (Unmod)	Non interfering channel.	DC probe thru detector (Fig. 5.) to pin 11 of picture tube. Common to chassis.	A10	Adjust for MINIMUM deflection.

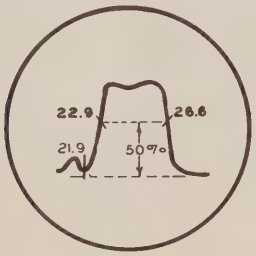


FIG.1

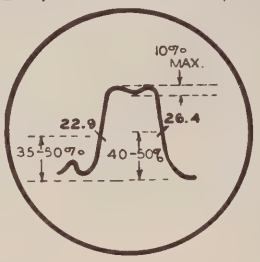


FIG.2

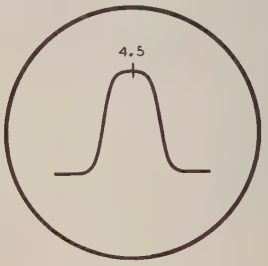


FIG. 3

FIG. 4

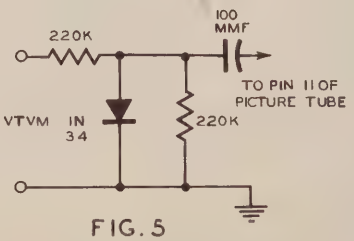


FIG. 5

ALIGNMENT INSTRUCTIONS (CONT.)

OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors.	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. amp thru 47KΩ to point B Low side to chassis.	A11	Adjust to place the sound marker slightly higher in frequency than the 21.9MC trap notch. This allowance is necessary to compensate for the frequency shift caused by removal of the tuner cover.
9.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check all high band channels to see if the markers can be properly placed within 30 degrees rotation from mid-position of the tuning control. If not, compress or expand L9 for proper marker placement. If L9 is adjusted it may be necessary to readjust A11 on channel 10.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
10.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6		A12	Set the fine tuning capacitor 15 degrees from mid-capacity (to greater capacity). Compress or expand coil turns for sound marker placement as in step 8.
11.	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5	"	A13	"
12.	"	"	69MC (10MC Swp)	67.25MC 71.75MC	4	"	A14	"
13.	"	"	63MC (10MC Swp)	61.25MC 65.75MC	3	"	A15	"
14.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"	A16	"

ANTENNA AND RF ALIGNMENT

Turn the Area Selector Switch to SUBURBAN position.
Disable the local oscillator by shorting across the oscillator inductance (position 2 to position 13 on the band switch).
The antenna coils are tuned to the video carriers and the RF coils are tuned to the sound carriers.
Preset A18 midway in its coil.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	177MC (10MC Swp)	175.25MC 179.75MC	7	Vert. Amp. thru 47KΩ to point C . Low side to chassis.	A17	Adjust to place markers within limits of Fig. 6.
16.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"	A18	Adjust to place markers within limits of Fig. 6. Recheck channel 7 and retouch A17 if necessary.
17.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"	A19	Check high band channels for response within the limits of Fig. 6. If necessary the peak of the response curves may be sharpened or broadened by altering the position of the ground end of the high frequency matching bus (A19). The normal position for the wire is approximately 3/16 inch from the switch shield.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
18.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A20, A21	Expand or compress coil turns for response within the limits of Fig. 7.
19.	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5		A22, A23	"
20.	"	"	69MC (10MC Swp)	67.25MC 71.75MC	4	"	A24, A25	"
21.	"	"	63MC (10MC Swp)	61.25MC 65.75MC	3	"	A26, A27	"
22.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"	A28, A29	"

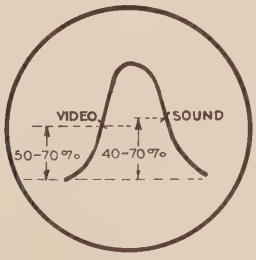


FIG. 6

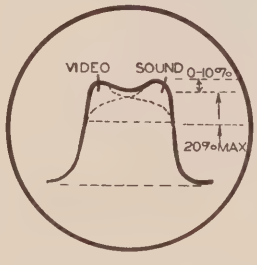
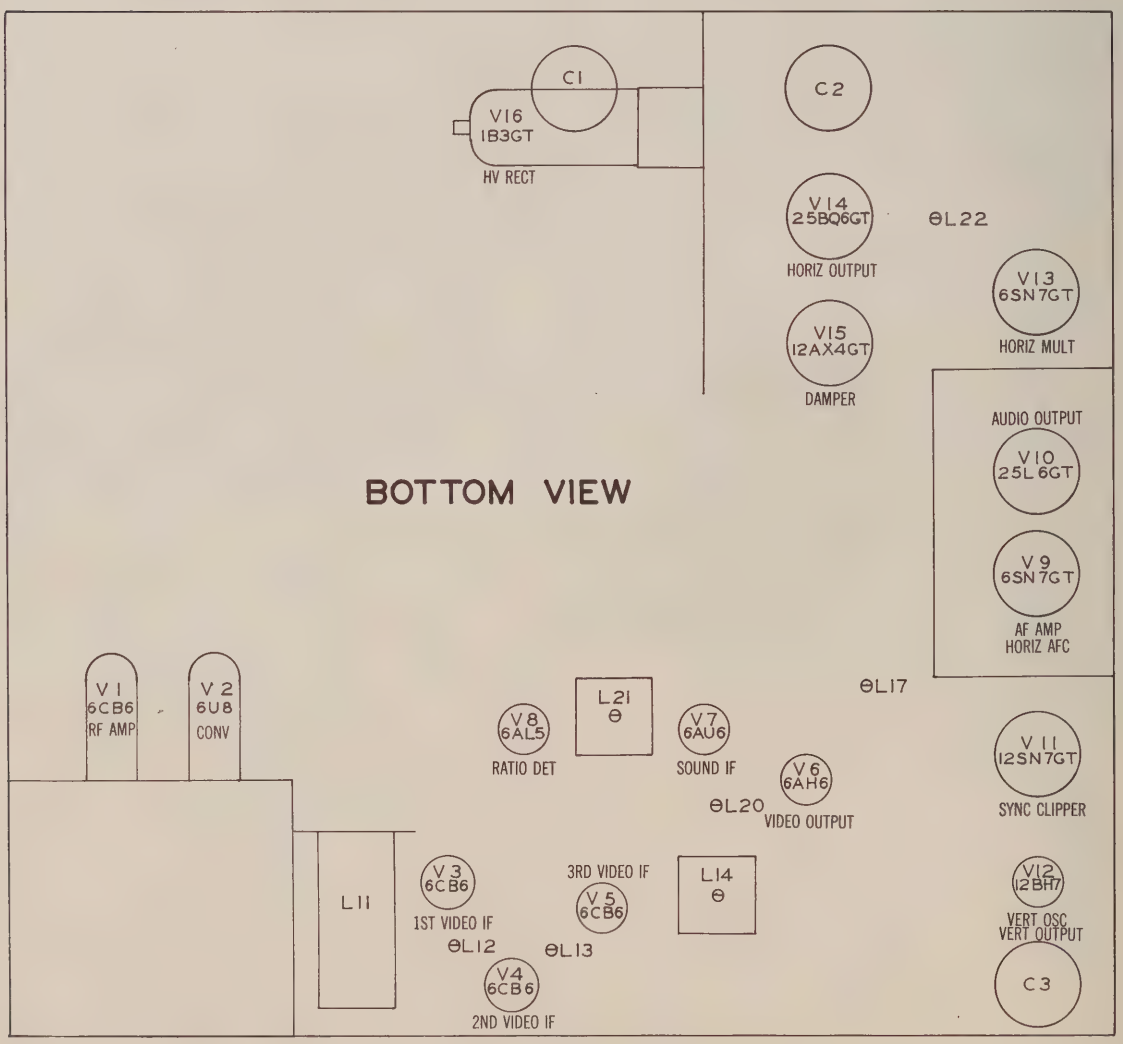


FIG. 7

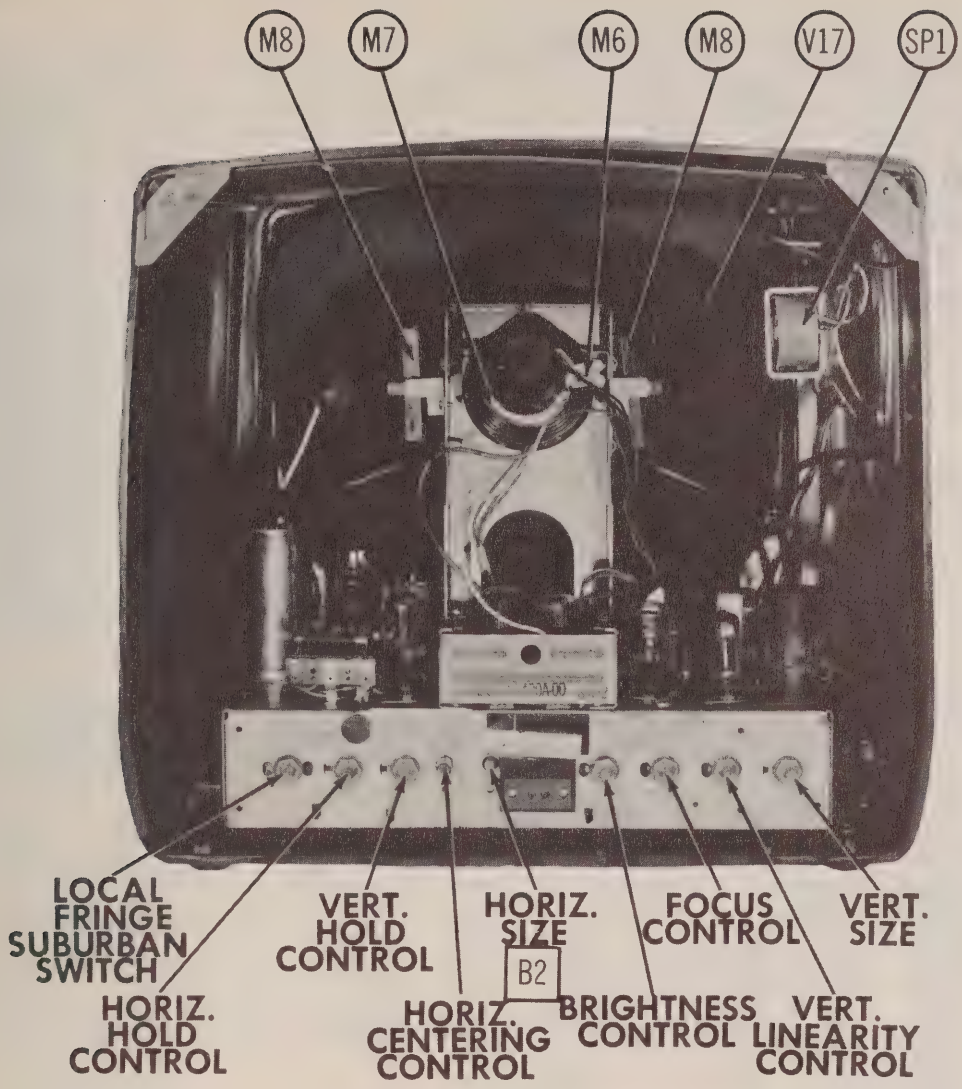
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	3.5Meg	33Ω	11Ω	8.4Ω	#220Ω	#10KΩ	0Ω		
V 2	6U8	#2.2KΩ	3.1Meg	#330KΩ	8.4Ω	6.4Ω	#220Ω	0Ω	0Ω	15KΩ
V 3	6CB6	1.5Meg	47Ω	19.5Ω	18Ω	#2.2KΩ	#2.2KΩ	0Ω		
V 4	6CB6	1.5Meg	47Ω	18Ω	17Ω	† 6.9KΩ	† 6.9KΩ	0Ω		
V 5	6CB6	.4Ω	150Ω	17Ω	15Ω	#1KΩ	#1KΩ	0Ω		
V 6	6AH6	1.1Meg	550Ω	6.4Ω	4.5Ω	4KΩ	33KΩ	550Ω		
V 7	6AU6	220Ω	220Ω	12Ω	8.4Ω	† 305Ω	† 305Ω	370Ω		
V 8	6AL5	INF	INF	15Ω	11Ω	6.8KΩ	0Ω	6.8KΩ		
V 9	6SN7GT	200Ω	† 33KΩ	1.5KΩ	264KΩ	22KΩ	100KΩ	3Ω	1.5Ω	
V 10	25L6GT	26KΩ	19.5Ω	† 275Ω	† 85Ω	† 33KΩ	182KΩ	22Ω	105KΩ	
V 11	12SN7GT	#2.2Meg	† 680KΩ	#0Ω	21KΩ	#9KΩ	2.2KΩ	19Ω	16Ω	
V 12	12BH7	■795Ω	■2.8Meg	9KΩ	12Ω	16Ω	■2.8Meg	550KΩ	50Ω	
V 13	6SN7GT	100KΩ	† 125KΩ	1.2KΩ	4.9Meg	†10KΩ	1.2KΩ	1.5Ω	0Ω	
V 14	25BQ6GT	INF	22Ω	† 125KΩ	#0Ω	330KΩ	22KΩ	19Ω	0Ω	TOP CAP ■18.5Ω
V 15	12AX4GT	INF	■12Ω	160KΩ	INF	† 85Ω	■300KΩ	22Ω	24Ω	
V 16	1B3GT	PINS 1 TO 8 HAVE INF. RESISTANCE								TOP CAP ■188Ω
V 17	17LP4	3Ω	1.8KΩ	PIN 6 42Ω	PIN 10 ■15Ω	PIN 11 570KΩ	PIN 12 4.5Ω			

AREA SELECTOR SWITCH IN "LOCAL" POSITION.
† MEASURED FROM OUTPUT OF M2.
# MEASURED FROM 150 VOLT LINE.
■ MEASURED FROM PIN 3 OF V15.



TUBE PLACEMENT CHART



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Normally the horizontal hold control will have a sync range of approximately 70 degrees. If the control is too critical, adjust as follows:

1. Shunt the horizontal oscillator coil (L22) to ground with a .25MFD, 400 volt capacitor. This may be done with the chassis in the cabinet by placing the capacitor across the 2 pin receptacle on rear of chassis.
2. With the horizontal centering lever, move the picture to the left so that the right edge of the raster is seen. Adjust the horizontal hold control for about 1/16" of sync pulse. (The sync pulse appears as a darker gray bar at the right edge of the blanking pulse. It may be necessary to adjust the contrast and brightness so that pulses are visible.)
3. Remove the .25MFD capacitor from across the horizontal oscillator coil.
4. Adjust the horizontal oscillator slug (B1) for the same amount of sync pulse as noted in Step 2.

Adjust the horizontal size adjustment (B2) for a picture tslightly wider than necessary to fill the picture mask horizontally. Since this adjustment also affects the vertical size it may be necessary to adjust the vertical size control.

RASTER CORRECTOR MAGNET ADJUSTMENT

Reduce raster size so that the corners are visible. Change the position of the corrector magnets until the sides of the raster are straight and the corners are at right angles.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA Part No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1	RF Amplifier	[illegible]	6CB6	7CM	
V2	Converter	6U8	6U8	9-AE	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output	6AH6	6AH6	7BK	
V7	Sound IF Amp.	6AU6	6AU6	7BK	
V8	Ratio Detector	6AL5	6AL5	6BT	
V9	AF Amplifier-Horiz. AFC	6SN7GT	6SN7GT	8BD	
V10	Audio Output	25L6GT	25L6GT	7S	
V11	Sync Clipper-Sync Phase Inv.	12SN7GT	12SN7GT	8BD	
V12	Vert. Oscillator-Vert. Output	12BH7	12BH7	9A	
V13	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V14	Horiz. Output	25BQ6GT	25BQ6GT	6AM	
V15	Damper	12AX4GT	12AX4GT	4CG	
V16	HV Rectifier	1B3GT	1B3GT	3C	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: MOTOROLA Part No.	REPLACEMENT DATA: SYLVANIA Part No.		RTMA BASE TYPE	NOTES
V17A	17LP4	17LP4		12C	
		L7VP4		12C	
B	17HP4	17HP4		12C	
		17RP4		12C	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA Part No.	AEROVOX Part No.	CENTRALAB Part No.	CORNELL-DUBILIER Part No.	ERIE Part No.	MALLORY Part No.	SPRAGUE Part No.	NOTES
C1	▲140	150	23B702779	E3A249		A026		FP117		
C2A	▲100	300	23B712088	E4D491		D109		FP419.4	TVL-4561	
B	▲200	150								
C	▲10	300								
D	30	150								
C3A	▲200	150	23B710941	E4D257		XB006		FP216.1.	TVL-2444	
B	▲5	150				BR415				
C4	20	450	23K710687	PRS450/20		BR2045A		TC75	TVA-1709	
C5	10	50	23A90205	PRS50/10		BR105		TC32	TVA-1304	
C6	10	50	23A90205	PRS50/10		BR105		TC32	TVA-1304	
C7	220		21R115905	S1220	D6-221		GP2K-221	UC-5322	5GA-T22	
C8	220		21R115905	S1220	D6-221		GP2K-221	UC-5322	5GA-T22	
C9	220		21K400941	S1220	D6-221		GP2K-221	UC-5322	5GA-T22	
C10	1500		21A701029	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C11	1500		21A701029	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C12	1500		21A701029	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C13	22		21R400942	S122	D6-220		GP1K-220	UC-5422	5GA-Q22	
C14A	1000		21K400937	BPD-2X001	DD-2-102	TM5DD1	812-001	DCD-521	5HK-2D1	
B	1000									
C15	12		21R114073	S112	D6-120		GP1K-120	UC-5412	5GA-Q12	
C16	.5-3		1V710954		829-3			CT565A		
C17	1		21R114071		TCZ-1		NP0K-010		5TCCB-V1	
C18	18		21R115640				N150K-180			
C19	.5-3		1V710954		829-3			CT565A		
C20	1500		21R701029	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C21A	800		21R400937	BPD-2X001	DD-2-152	TM5DD1	812-001	DCD-521	5HK-2D1	
B	800									
C22	10000		21R482726	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C23	1500		21A701029	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C24	5000		21R115312	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C25	1500		21A701029	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C26	1000		21R400936	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C27	1000		21R400936	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C28	1000		21R400936	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C29	1000		21R400936	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C30	1000		21R400936	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C31	1000		21R400936	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C32	5000		21R115312	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C33A	1000		21R400937	BPD-2X001	DD-2-102	TM5DD1	812-001	DCD-521	5HK-2D1	
B	1000									
C34	4		21K38951				NP0K-040			
C35	.22	200	21R9810	P488-22		PTE4P22		PT4025	2TM-P22	
C36	.1	100	21R9814	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C37	68		21R115897		TCN-68		N750L-680		5TCU-Q68	
C38	1000		21R400936	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C39	5000		21R115312	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C40	5000		21R115312	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C41	30		21R470329		TCN-30		N750K-300			
C42	.1	400	8R490236	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C43	5000		21R115312	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C44	2.2		21A478274		TCZ-2.2		NP0K-2R2		5TCCB-V22	
C45	68		21R400928		TCN-68		N750L-680		5TCU-Q68	
C46	5000		21R115312	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C47	5000		21R115312	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C48	5000		21R115312	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C49	1000		21R400936	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C50	1000		21R400936	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C51	470		21K400940	SI470	D6-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C52	1000		8R490268	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C53	5000		21R115312	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C54	5000		21R115312	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C55	.003	200	8K9820	P688-003	D6-302	PTE6D3	GP2-333-302	PT623	6TM-D3	

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA Part No.	AEROVOX Part No.	CENTRALAB Part No.	CORNELL-DUBILIER Part No.	ERIE Part No.	MALLORY Part No.	SPRAGUE Part No.	NOTES
C56	.04	600	8K400028	P688-04		PTE6S4		PT614	6TM-S4	Note 1
C57	.005	600	8R9869	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	Note 2
C58	220		21R115905	SI220	D6-221	5W5T25	GP2K-221	UC-5322	5GA-T22	
C59	.005	600	8R490222	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C60	22		21R900942	SI22	D6-220	5W5Q25	GP1K-220	UC-5422	5GA-Q22	
C61	.05	400	8R490232	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C62	.0047	400	8R490222	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C63	.0047	400	8R490222	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C64	.01	400	8R490226	P488-01	D6-103	PTE4S1	GP2-333-103	PT41	4TM-S1	
C65	.005	600	8R9869	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C66	.047	400	8R490232	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C67	.047	400	8R490232	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C68	5000		21R115312	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C69	470	500	21R6673	1468-0005	D6-471	5W5T5	GP2K-471	MC245	1FM-35	
C70	470	500	21R6673	1468-0005	D6-471	5W5T5	GP2K-471	MC245	1FM-35	
C71	.001	600	8R9866	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C72	470	500	21R6673	1468-0005	D6-471	5W5T3	GP2K-471	MC245	1FM-35	
C73	.01	400	8R9858	P488-01	D6-103	PTE4S1	GP2-333-103	PT41	4TM-S1	
C74	47		21R114207	S147N750	TCN-47		N750K- 470	NT-5447	5TCU-Q47	
C75	.001	1000	8R9866	PJ088-001		PTE16P1		PT1621	MB-D1	
C76	.002	600	8R9867	P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	
C77	.0033	400	8R9868	P688-0033	D6-332	PTE6D33	GP2-333-332	PT6233	6TM-33	
C78	.01	100	8R9858	P488-01	D6-103		PTE4S1	GP2-333-103	PT41	4TM-S1
C79	220		21R115905	SI220	D6-221	5R5T25	GP2K-221	UC-5322	5GA-T22	
C80	390	500	21R114740	1469-0004		5R5T4		MCB243	MS-34	
C81	.0047	400	8R490222	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C82	680	500	21R114781	1479-0007		5R5T7			MS-37	
C83	5000		21R115312	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C84	5000		21R115312	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C85	180	3000	21K701873							
C86	.02	600	8R9871	P688-02	DF-203	PTE6S2		PT612	6TM-S2	Note 3

Note 1. Not used in Chassis TS410A.
Note 2. Chassis TS400A uses .01MFD in this application. (Part #8R9858).
Note 3. Used in Chassis TS410A only.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA Part No.	IRC Part No.	CLAROSTAT Part No.	CENTRALAB Part No.	MALLORY Part No.	INSTALLATION NOTES
R1A	2500Ω	½	18K702864	QJ-322 *	RT-344			Contrast-Tapped ⑧ 500Ω-Panel
B	1Meg	½						Volume & Sw.-Tapped ⑧ 300K Ω Rear
R2A	1Meg	½	18A711999	Q11-137	AG-61-S		U-54	Tone - Note 1
B	Shaft		Not Req.	PQ	RS-2		Not Req.	Attach to R2A
R3A	100KΩ	½	18A702466	Q11-125	AG-49-S	AB-40	U-41	Horiz. Hold - Note 2
B	Shaft		Not Req.	Not Req.	RS-2	AK-4	Not Req.	Attach to R3A
R4	850KΩ	½	18K711278	Q11-133			U-50	Vert. Hold - Note 3
R5	50Ω	1	18K710607					Horiz. Centering-Wire Wound-Note 4
R6A	5.1Meg	½	18A702441	Q11-141	AG-85-S		U-85	Brightness-Note 5
B	Shaft		Not Req.	Not Req.	RS-2		Not Req.	Attach to R6A
R7A	1.5Meg	½	18A720289	Q11-138	AG-83-S	AB-75	U-155	Focus
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R7A
R8A	750Ω	½	18A702475	Q11-105	AG-8-S			Vert. Linearity
B	Shaft		Not Req.	Not Req.	RS-2			Attach to R8A
R9A	5Meg	½	18A702443	Q11-141	AG-85-S	AB-87	U-87	Vert. Size -Note 6
B	Shaft		Not Req.	Not Req.	RS-2	AK-4	Not Req.	Attach to R9A

* CONCENTRIKIT EQUIVALENT - KIT K-4, BASE ELEMENTS & SHAFTS B17-111X & P1-212 (Panel) B13-137X & R4-228 (Rear) & SWITCH 76-1.

Note 1. Used only in Chassis #TS-400A.
Note 2. Connect a 39KΩ resistor in series with clockwise terminal and pin 1 of V13. This control is used with set screw type knobs. For those receivers employing push-on type knobs, this control is part #18A720195.
Note 3. Connect a 330KΩ resistor in series with clockwise terminal and ground. This control is used with set screw type knobs. For those receivers employing push-on type knobs this control is part #18A720196.
Note 4. Some Models use 75Ω control in this application (Part #1V721286).
Note 5. Connect a 100KΩ resistor in series with clockwise terminal terminal and ground.
Note 6. Connect a 1Meg resistor in series with clockwise terminal and positive side of C4.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA Part No.	IRC Part No.	NOTES
R10	22KΩ	½	6R6397		
R11	470KΩ	½	6R6032	BTS-470K	
R12	33Ω	½	6R2036		
R13	10KΩ	½	6R6054	BTS-10K	
R14	220Ω	½	6R3933	BTS-220	
R15	22KΩ	½	6R6397		
R16	4700Ω	½	6R6039	BTS-4700	
R17	100KΩ	½	6R6075	BTS-100K	
R18	330KΩ	½	6R6014	BTS-330K	
R19	15KΩ	½	6R2119	BTS-15K	
R20	1000Ω	½	6R6301	BTS-1000	
R21	1000Ω	½	6R6301	BTS-1000	
R22	1000Ω	½	6R6301	BTS-1000	
R23	6800Ω	½	6R6428		
R24	47Ω	½	6R5550		
R25	2200Ω	1	6R6409	BTA-2200	
R26	15KΩ	½	6R6477		
R27	47Ω	½	6R5550		
R28	8200Ω	½	6R2004	BTS-8200	
R29	6800Ω	2	6R490349		
R30	8200Ω	½	6R2004	BTS-8200	
R31	150Ω	½	6R6373	BTS-150	
R32	1000Ω	½	6R6301	BTS-1000	
R33	1.5Meg	½	6R6460	BTS-1.5Meg	
R34	1.5Meg	½	6R3966	BTS-1.5Meg	
R35	5600Ω	½	6R6117	BTS-5600	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA Part No.	IRC Part No.	NOTES
R36	100KΩ	½	6R6075	BTS-100K	
R37	1Meg	½	6R6046	BTS-1Meg	
R38	33KΩ	1	6R6400	BTA-33K	
R39	3900Ω	2	6R4760L2	BTB-3900	
R40	10KΩ	½	6R6054	BTS-10K	
R41	150Ω	½	6R3992	BTS-150	
R42	220Ω	½	6R3933	BTS-220	
R43	220Ω	½	6R3933	BTS-220	
R44	120Ω	½	6R5551	BTS-120	
R45	33KΩ	½	6R6012	BTS-33K	
R46	6800Ω	½	6R6428	BTS-6800	
R47	6800Ω	½	6R6428	BTS-6800	
R48	68KΩ	½	6R6001	BTS-68K	
R49	1500Ω	½	6R6038	BTS-1500	
R50	33KΩ	1	6R4010L2	BTA-33K	
R51	470KΩ	½	6R6032	BTS-470K	
R52	2.2Meg	½	6R3927	BTS-2.2Meg	
R53	680KΩ	½	6R6475	BTS-680K	
R54	560KΩ	½	6R5897	BTS-560K	
R55	22KΩ	½	6R6028	BTS-22K	
R56	2200Ω	½	6R6069	BTS-2200	
R57	6800Ω	½	6R6428	BTS-6800	
R58	2200Ω	½	6R6069	BTS-2200	
R59	22KΩ	½	6R6028	BTS-22K	
R60	10KΩ	½	6R6054	BTS-10K	
R61	4700Ω	2		BTB-4700	Note 1

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA Part No.	IRC Part No.	NOTES
R62	3900Ω	2		BTB-3900	Note 2
R63	120Ω	½	6R5551	BTS-120	
R64	3300Ω	½	6R5581	BTS-3300	
R65	1800Ω	½	6R2089	BTS-1800	
R66	82KΩ	½	6R5644	BTS-82K	
R67	82KΩ	½	6R5644	BTS-82K	
R68	100KΩ	½	6R6031	BTS-100K	
R69	22KΩ	½	6R6397	BTS-22K	
R70	4.7Meg	½	6R2122	BTS-4.7Meg	
R71	150KΩ	1	6R410053	BTA-150K	
R72	150KΩ	1	6R410053	BTA-150K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA Part No.	IRC Part No.	NOTES
R73	5600Ω	½	6R6117	BTS-5600	
R74	1200Ω	½	6R6393	BTS-1200	
R75	120KΩ	½	6R563[illegible]	BTS-120K	
R76	4700Ω	½	6R6039	BTS-4700	
R77	330KΩ	½	6R2096	BTS-330K	
R78	4700Ω	½	6R6039	BTS-4700	
R79	7.5Ω	5	1K711027		
R80	*	7	1K720680		
R81	80Ω	10	17K711224	D[illegible]-3/4A-75	
R82	120Ω	10	17K712038	D[illegible]-3/4A-125	

Note 1. Some Models use a 8700Ω (3watt) resistor in this application.
Note 2. Not used in all Models.
* Special resistor 19Ω hot, 230Ω cold.

PROPERTY OF C. F. RINKENSHIP [illegible] MADE IN U.S.A.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: MOTOROLA Part No.	STANCOR Part No.	MERIT Part No.	CHICAGO Part No.	TRIAD Part No.	NOTES
T1	50Ω	220Ω	25K702429-K 25K702429 ① 25K710730 ①	A-8125	A-3000 ②	TBO-2 ②	A-97Y	Vert. Osc. Trans.
T2	188Ω tap ④ 18Ω	21Ω SEC. 2 0Ω	24C712290 ③					Horiz. Output Trans.
T3	780Ω tap ④ 1Ω		25B702455-K 25K721027 ④	A-8140 ⑤⑥	A-3081 ④	TSO-6⑤⑥	A-103X ② ⑧	Vert. Output Trans.
T4A	35Ω		24K720155	DY-10 ⑦	MDF-30 ⑦	TY-4 ⑦	Y-20 ⑦	Horiz. Deflection Coils
B	3.3Ω							Vert. Deflection Coils

① Alternate Vert. Osc. Trans.
② Drill one new mounting hole.
③ Includes 1B3 Horiz. Centering Cont.
④ Alternate Vert. Output Trans.
⑤ Drill new mounting holes.
⑥ Tie blue & yellow leads together
⑦ Use original deflection coil network
⑧ Connect as auto trans.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: MOTOROLA Part No.	STANCOR Part No.	MERIT Part No.	CHICAGO Part No.	TRIAD Part No.	NOTES
T5	2KΩ	3.5Ω	190Ω	.6Ω	25B710925	A-3876	A-2928	RO-304	S-2X	

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: MOTOROLA Part No.	JENSEN Part No.	QUAM Part No.	NOTES
SP1	6"	85Ω	3.5Ω	50C711067 50C711976 ① 50C710615 ① 50C489002 ① 50C721467 ② 50K700850 ④ 50C703098 ③ 50C720156 ③ 50C703337 ③ 50C721294 ③ 50C701328 ④ 50C701634 ④ 50C703099 ④ 50C702057 ④ 50C702550 ④ 25B701075 ⑤		6E85S	① Alternate 6" EM Speakers ② 6"x9" EM Speaker ③ 8" EM Speakers ④ 10" PM Speakers ⑤ Filter Choke used with PM Speakers

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: MOTOROLA Part No.	MERIT Part No.	IRC Part No.	NOTES
L1	Ant. Impedance Matching Coil	0Ω		24A790033			Tapped
L2	Ant. Shunt Coils	0Ω		24K703079			Channels 2-6
L3	Ant. Shunt Coils	0Ω		24K703078			Channels 7-13
L4	Ant. Coils	0Ω		24K703003			Channels 2-7
L5	RF Coil	0Ω		24C703076			Channels 13
L6	RF Coils	0Ω		24K703002			Channels 2-7
L7	RF Choke	2Ω		24K792577		CL-1	3.3 Microhenries
L8	Fil. Choke	0Ω		24A720110			
L9	Osc. Coil	0Ω		24K703077			Channel 13
L10	Osc. Coils	0Ω		24C703001			Channels 2-7
L11	1st. Video IF	.4Ω	.3Ω	24B702983	TV-100 †		
L12	2nd. Video IF	.4Ω	.4Ω	1V712105			
L13	3rd. Video IF	.4Ω	.4Ω	1V712106			
L14	4th. Video IF	.4Ω	.4Ω	24K712104			Includes Trap, also includes Series Peaking Coil and 33KΩ Resistor

MOTOROLA
MODELS 17T11E (Ch. TS-400A), 17T13 (Ch. TS-410A)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF) CONT.

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	MOTOROLA PART No.	MERIT PART No.	IRC PART No.	
L15	Series Peaking Coil	2.8Ω		24B711413	TV-180		28 Microhenries
L16	Series Peaking Coil	12Ω		24K712101 *			Wound on 5.6KΩ Resistor
L17	4.5MC Trap	3.2Ω		1V792736	TV-151		
L18	Shunt Peaking Coil	9.5Ω		24K710140 ■	TV-184		203 Microhenries
L19	Shunt Peaking Coil	15Ω		24K712102♦			Wound on 6.8KΩ Resistor
L20	Sound IF	1Ω		1V790341	TV-151		
L21	Ratio Det.	2.8Ω	.3Ω CT	24B702543	TV-110		Tertiary Winding ~.25Ω
L22	Horiz. Osc.	50Ω		24K701558	TV-163		
L23	Horiz. Lin.	13.5Ω		24A710751			Wound on .15MMF capacitor

* Alternate part #24K712110
■ Alternate part #24B711875
♦ Alternate part #24K712111
† Requires new mounting holes.

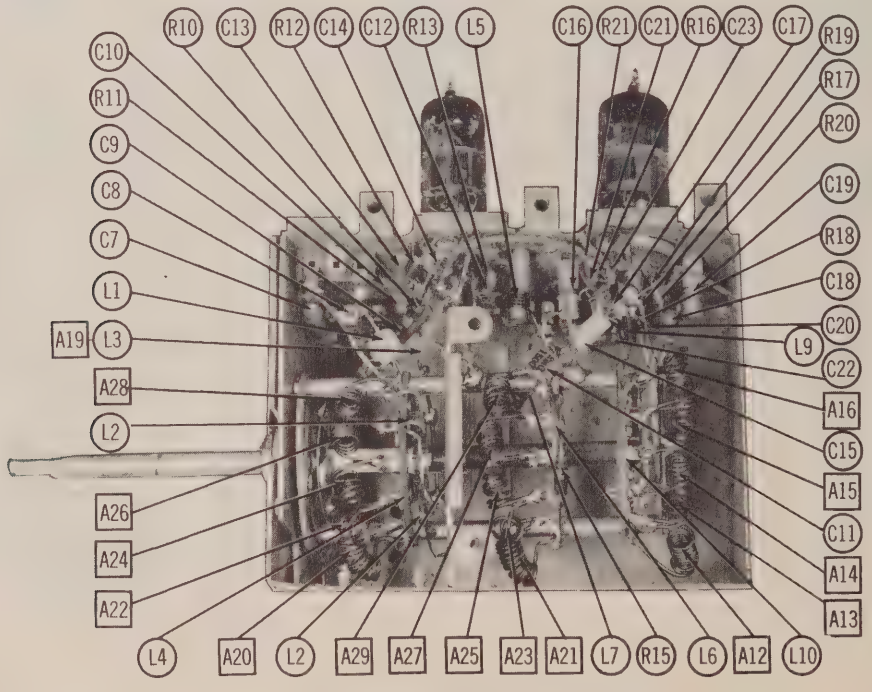
SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA					
	CURRENT	MOTOROLA PART No.	SYLVANIA PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.
M1	.180	48B720023 48B703089 ① 48B700555 ①	NH5	6Q2	1090A	6S300	300
M2	.180	48B720023	NH5	6Q2	1090A	6S300	300

① Alternate Selenium Rectifier

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	RF Tuner	1U720225	TT-24A
M4	Crystal Diode	48C711052	Video Detector (1N60)
M5	Switch	40A720172	Area Selector
M6	Centering Magnet	48A721145	Includes Yoke Cover
M7	Ion Trap	24K711843	
M8A	Correction Magnet	48B720968	Right-hand
B	Correction Magnet	48K720969	Left-hand
	Cabinet	16K720299	Ebony Plastic, Model 17T11E
	Cabinet	16K721392	Walnut Plastic, Model 17T13
	Safety Glass	61D720245	Model 17T11E
	Safety Glass	61C702528	Model 17T13
	Bezel	13K720279	Model 17T11E
	Mask	13D711665	Model 17T13
	Back Cover	1V721115	Model 17T11E
	Back Cover	1V710771	Model 17T13
	Knob	36K720180	Channel Selector, Model 17T11E
	Knob	36C712027	Channel Selector, Model 17T13
	Knob	36K720181	Contrast, Model 17T11E
	Knob	36K712028	Contrast, Model 17T13
	Knob	36K720182	Off/On Volume, Fine Tuning (2Used), Model 17T11E
	Knob	36C712026	Off/On Volume, Fine Tuning (2 Used), Model 17T13
	Lever	36K712007	Tone Control, Model 17T11E



RF TUNER

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of the RF tuner oscillator adjustments it is necessary to remove the chassis from the cabinet. (See disassembly instructions).

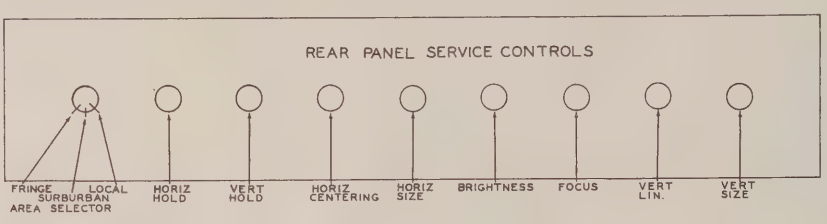
PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For the adjustment of the horiz. oscillator slug, it is necessary to remove the rear cover, and supply power to set with a cheater cord. Adjustment is located on top of chassis. (See tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

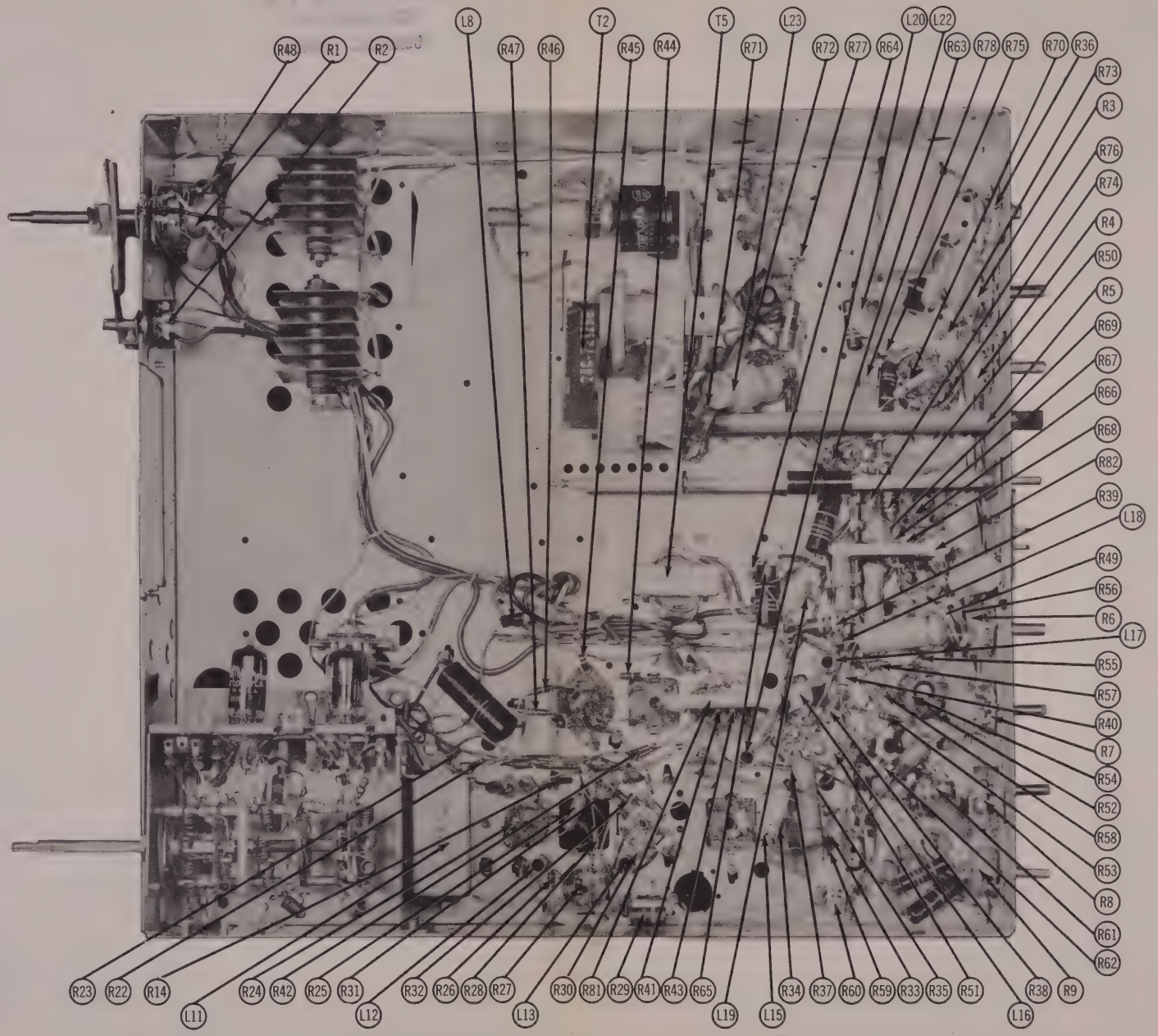
To eliminate detector buzz, adjust the ratio detector secondary (L21) located on bottom of chassis. (See tube placement chart).

CENTERING

Horiz. and vertical centering is accomplished by mechanical means. There is an additional horiz. centering control. This control is set at the mid-point of its rotation when making the mechanical adjustment. If horiz. centering cannot be accomplished mechanically, a slight readjustment of the centering control may be necessary.

DISASSEMBLY INSTRUCTIONS

1. Chassis removal.
   a. Remove 4 push on type control knobs and 1 tone arm control from front panel.
   b. Disconnect built in antenna. Remove 2 screws. Remove antenna bracket from rear cover.
   c. Remove 3 screws. Remove rear cover.
   d. Disconnect speaker. Remove 4 speaker nuts. Remove speaker.
   e. Remove 4 chassis bolts and rubber pads. Remove chassis.
2. Picture tube removal.
   a. Removal of chassis is necessary.
3. Picture tube cleaning.
   a. Removal of chassis is necessary.

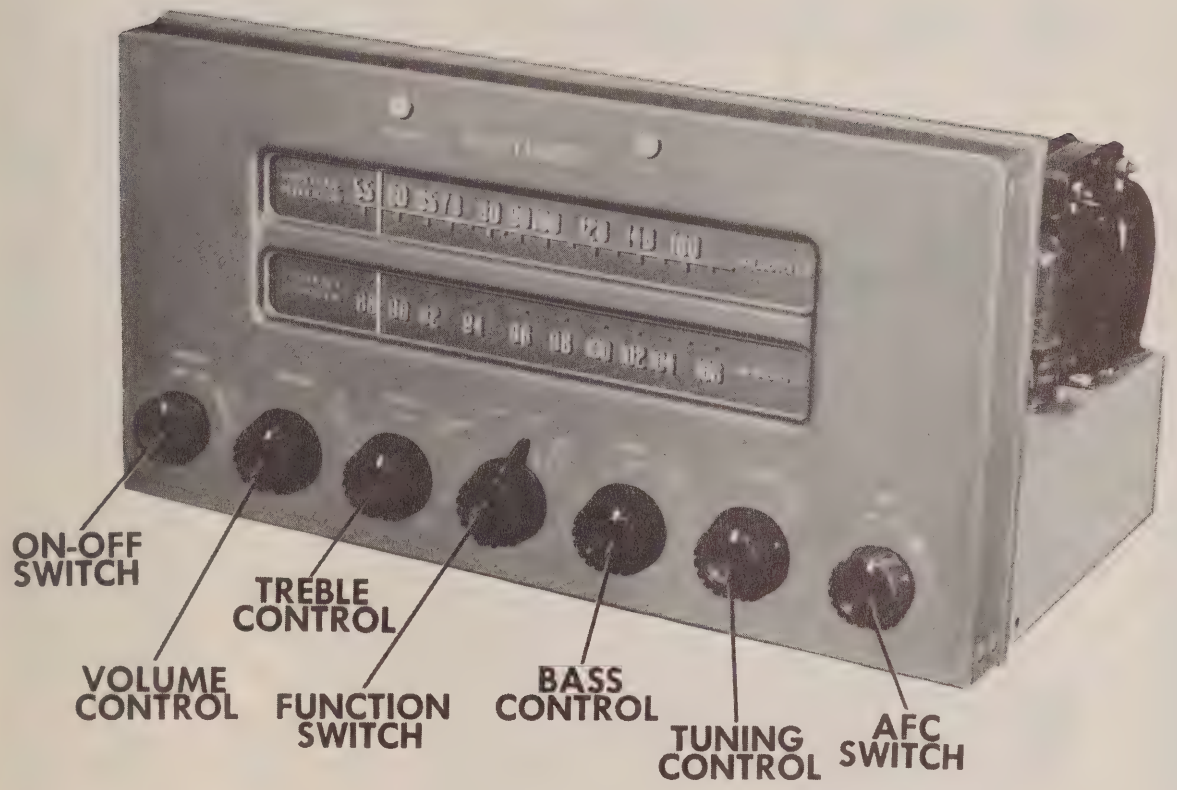


CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PILOT
MODELS AF-821A, U

PROPERTY OF
F. E. ANDERSON

PILOT
MODELS AF-821A, U

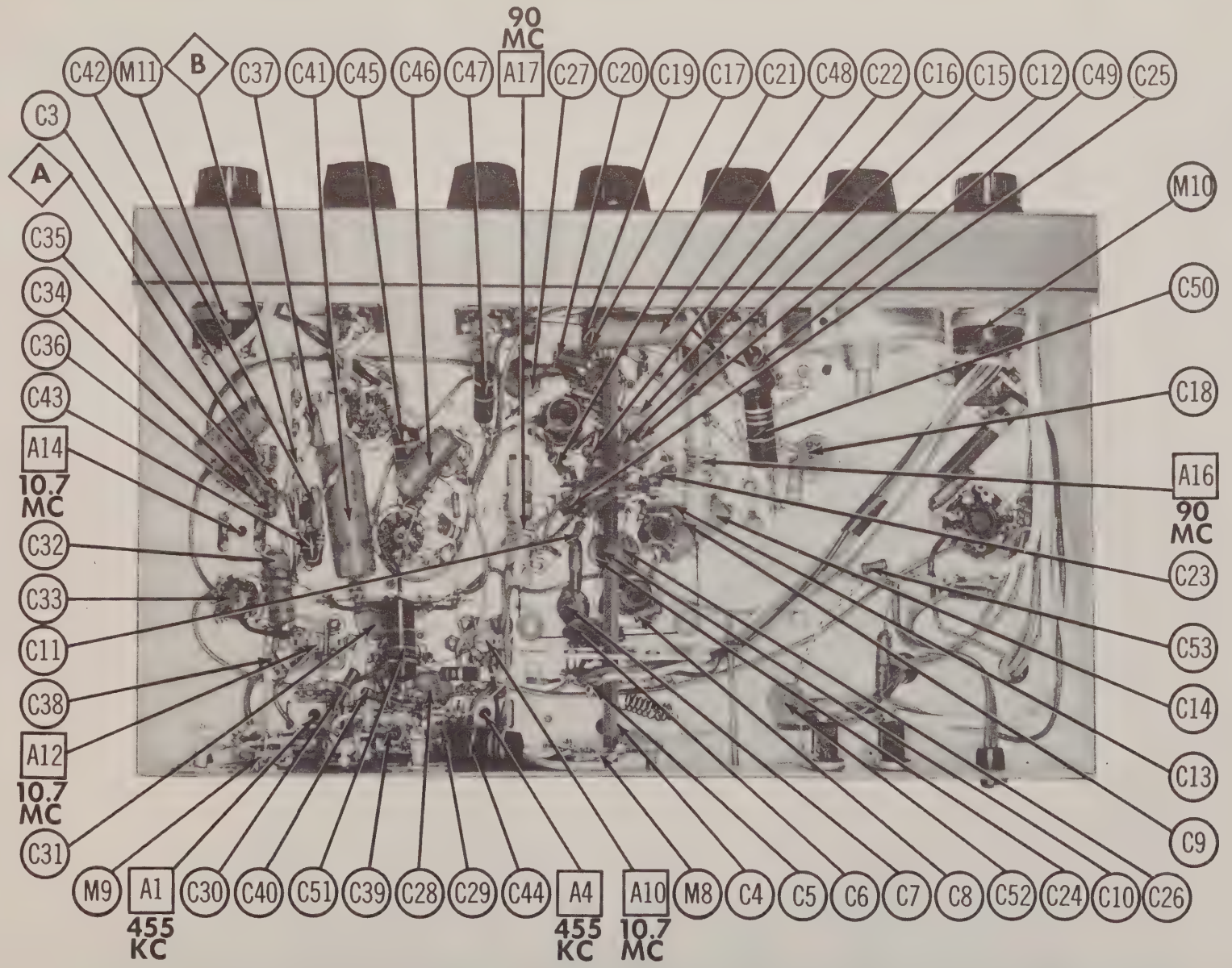


PILOT
MODELS AF-821A, U

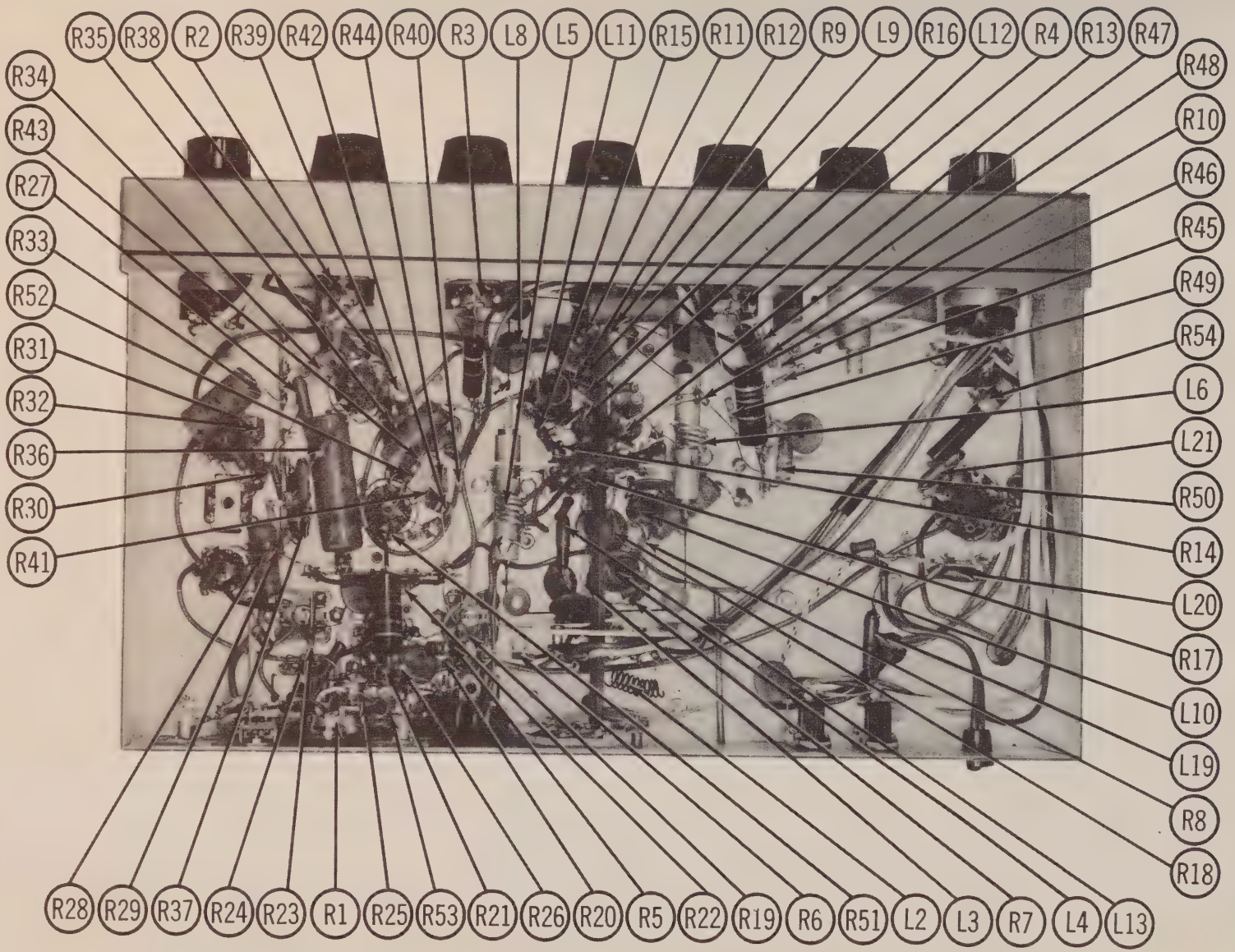
TRADE NAME	Pilot Model AF-821A, AF-821U	
MANUFACTURER	Pilot Radio Corp., 37-06 36th. St., Long Island City, N.Y.	
TYPE SET	AC Operated AM-FM Superheterodyne Tuner for Custom Installation with Phono Provisions	
TUBE (Nine)	Types 6BA6 FM-AM RF Amp., 6AB4 AFC Control, 6U8 Conv., 6BA6 1st. FM AM IF Amp., 6AU6 2nd. FM IF Amp.-AM Det.-AVC, 6AL5 Ratio Det., 12AX7 Phono Pre-Amp.-AF Amp., 12AU7 AF Amp., 6X5GT Rectifier	
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING .38 Amp. @ 117 Volts AC
TUNING RANGE	- BROADCAST 540-1700 KC	FM 88-108MC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

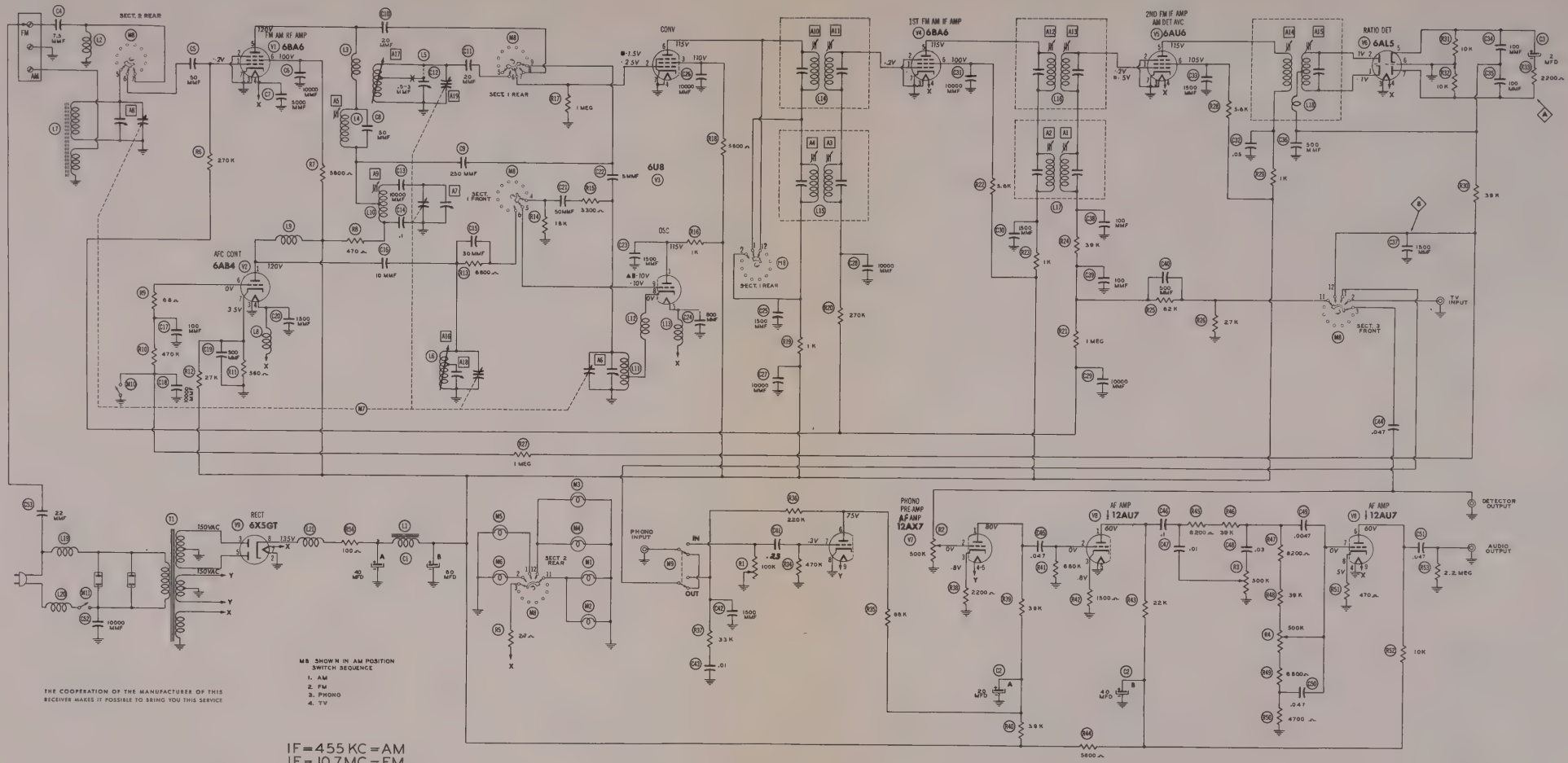
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BA6	1.4Meg	0Ω	0Ω	.1Ω	†705Ω	†5.8KΩ	0Ω		
V 2	6AB4	†205Ω	0Ω	0Ω	.1Ω	INF	470KΩ	560Ω		
V 3	6U8	†1.2KΩ	1 Meg	†5.8KΩ	0Ω	.1Ω	†1.2KΩ	0Ω		6.8KΩ ■18KΩ
V 4	6BA6	1.4Meg	0Ω	0Ω	.1Ω	†1.2KΩ	†5.8KΩ	0Ω		
V 5	6AU6	150KΩ	0Ω	0Ω	.1Ω	†1.2KΩ	†5.8KΩ	0Ω		
V 6	6AL5	1 Meg	1 Meg	0Ω	.1Ω	10KΩ	0Ω	10KΩ		
V 7	12AX7	†78KΩ	20Ω	2.2KΩ	.1Ω	.1Ω	†107KΩ	470KΩ	0Ω	.1Ω
V 8	12AU7	†28KΩ	680KΩ	1.5KΩ	0Ω	0Ω	†16KΩ	11.5KΩ	470Ω	.1Ω
V 9	6X5GT	†100Ω	0Ω	77Ω	INF	81Ω	INF	.1Ω	28KΩ	
V 10										

ALL MEASUREMENTS TAKEN IN FM POSITION UNLESS OTHERWISE SPECIFIED(AFC SWITCH IN " OFF" POSITION)
▲ TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM PIN 8 OF V9
■ MEASURED IN AM POSITION (TONE CONTROLS IN "FLAT" POSITION)

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1953

194-10

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Connect the tuner output to an audio amplifier during alignment.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Check the FM oscillator and RF co-axial capacitors to see that they are fully engaged when the AM gang is fully closed.
Set the controls to 'flat' position.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Direct	High side to AM antenna terminals. Low side to chassis.	455KC (400∿Mod)	AM	55	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	200MMF	High side to AM antenna terminals. Low side to chassis.	"	"	"	"	A5	Adjust for MINIMUM output.
3.	"	"	1500KC	"	150	"	A6, A7, A8	Adjust for maximum output while rocking tuning gang.
4.	"	"	600KC	"	60	"	A9	Repeat steps 3 and 4 for optimum results.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	Direct	High side to FM antenna terminal. Low side to chassis.	10.7MC (Unmod)	FM	88	DC probe to point (A) Common to chassis.	A10, A11, A12, A13, A14	Adjust for maximum deflection.
6.	"	"	"	"	"	DC probe to point (B) Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	Direct	High side to FM antenna terminals. Low side to chassis.	10.7MC (450KC Swp)	FM	88	Vert. amp to point (A) Low side to chassis.	A10, A11, A12, A13 A14	Disconnect stabilizer capacitor C3. Adjust for curve of maximum amplitude and symmetry as in Fig. 1.
6.	"	"	"	"	"	Vert. amp to point (B) Common to chassis.	A15	Reconnect capacitor C3. Adjust so that 10.7MC occurs at center of crossover lines as in Fig. 2. SLIGHTLY retouch A14 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

The signal generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Turn AFC switch to 'off' position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	120Ω Carbon Resistor	High side thru 120Ω to FM antenna termi terminals. Low side to chassis.	90MC (Unmod)	FM	90	DC probe to point (A) Common to chassis.	A16, A17	Compress or expand for maximum deflection while rocking tuning gang.
8.	"	"	106MC	"	106	"	A18, A19	Adjust for maximum deflection. while rocking tuning gang.
9.	"	"	98 MC	"	98	"	A20	Compress or expand for maximum deflection while rocking tuning gang.

FIG. 1

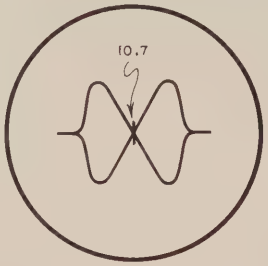


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

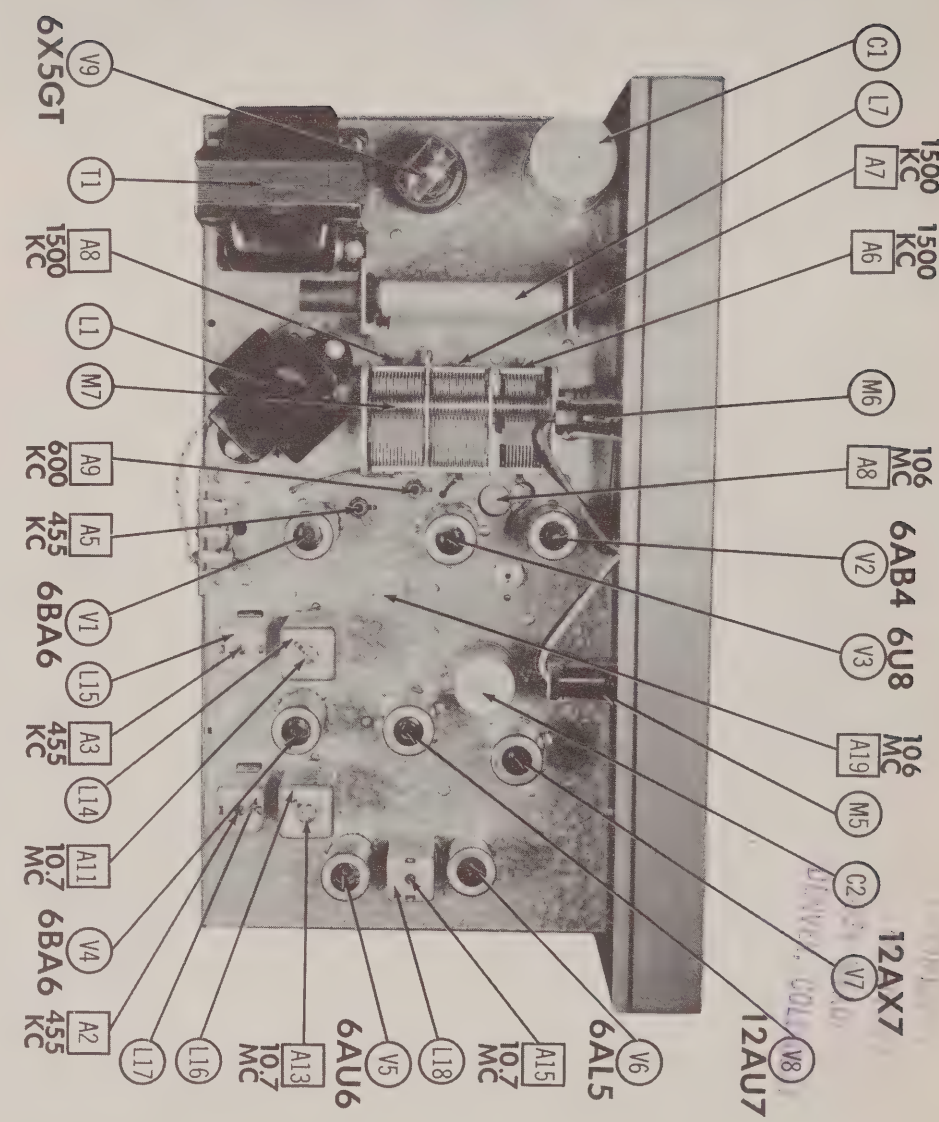
ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	NOTES
		PILOT PART No.	STANDARD REPLACEMENT		
V1	FM AM RF Amp.	6BA6	6BA6	7BK	
V2	AFC Control	6AB4	6AB4	5CE	
V3	Converter	6U8	6U8	9-AE	
V4	1st. FM AM IF Amp.	6BA6	6BA6	7BK	
V5	2nd. FM IF Amp.- AM Det.-AVC	6AU6	6AU6	7BK	
V6	Ratio Detector	6AL5	6AL5	6BT	
V7	Phono Pre-Amp.- AF Amplifier	12AX7	12AX7	9A	
V8	AF Amplifier	12AU7	12AU7	9A	
V9	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	PILOT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲40	250		AFH2-64		B048		FP377	TVL-2582	
B	▲80	250								
C2A	■20	250		AFH2-28		B023		FP230	TVL-2540	
B	▲40	250								
C3	2	50		PRS150/4		BBR2-50T		TC302	TVA-1301	
C4	7.5									
C5	50			SI50	D6-500	TM5Q5	GP1K-500	UC-545	5GA-Q5	
C6	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C7	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C8	50				TCZ-50		NP0K- 500	ZT-545	5TCC-Q5	
C9	250			SI250	D6-251		GP2K-251	UC-5325	5GA-T25	
C10	20			SI20	D6-200		GP1K-200	UC-542	5GA-Q2	
C11	20			SI20	D6-200		GP1K-200	UC-542	5GA-Q2	
C12	.5-3				829-3			CT565A		
C13	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C14	.1	400		P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C15	30						N220K-300			
C16	10									
C17	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C18				BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C19	500			SI500	D6-501	TM5T5	GP2K-501	UC-535	5GA-T5	
C20	1500			SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C21	50			SI50	D6-500	TM5Q5	GP1K-500	UC-545	5GA-Q5	
C22	.5			SI5N750	TCZ-5		N750K-050		5TCUB-V5	
C23	1500			SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C24	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C25	1500			SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C26	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C27	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C28	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C29	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C30	1500			SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C31	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C32	.05	400		P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C33	1500			SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C34	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C35	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C36	500			SI500	D6-501	TM5T5	GP2K-501	UC-535	5GA-T5	
C37	1500			SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C38	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C39	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C40	500			SI500	D6-501	TM5T5	GP2K-501	UC-535	5GA-T5	
C41	.047	600		P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C42	1500			SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C43	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C44	.047	400		P488-047	DF-503	PTE4S47		PT4147	4TM-S47	Note 1
C45	.047	400		P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C46	.1	400		P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C47	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C48	.03	400		P688-03		PTE6S3		PT613	6TM-S3	
C49	.0047	400		P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C50	.047	400		P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C51	.047	400		P488-047	DF-503	PTE4S47		PT4147	4TM-S47	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA PILOT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C52	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C53	22			S122	D6-220	5W5Q25	GP1K-220	UC-5422	5GA-Q22	Note 2

Note 1. Some Models use .022MFD in this application.
Note 2. Some Models use 30MMF in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PILOT PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	100KΩ	½	39-32	Q11-128	AG-49-S	AB-40	SU-41	Phono Pickup Adjustment
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R1A
R2A	500KΩ	½	37-23A	Q13-133	AG-60-Z	B-60	U-48	Volume - See Note 1
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	500KΩ	½	37-23A	Q13-133	AG-60-Z	B-60	U-48	Treble - See Note 2
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
R4A	500KΩ	½	37-23A	Q13-133	AG-60-Z	B-60	U-48	Bass - See Note 2
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A

Note 1. Some Models use alternate control (Part #36-43).
Note 2. Some Models use alternate control (Part #39-23).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA PILOT PART No.	IRC PART No.	NOTES
R5	2.7Ω	1			
R6	270KΩ	½		BTS-270K	
R7	5600Ω	½		BTS-5600	
R8	470Ω	½			
R9	68Ω	½			
R10	470KΩ	½		BTS-470K	
R11	560Ω	½		BTS-560	
R12	27KΩ	1		BTA-27K	
R13	6800Ω	½		BTS-6800	
R14	18KΩ	½		BTS-18K	Note 1
R15	3300Ω	½			
R16	1000Ω	½		BTS-1000	
R17	1Meg	½		BTS-1Meg	
R18	5600Ω	½		BTS-5600	
R19	1000Ω	½		BTS-1000	
R20	270KΩ	½		BTS-270K	
R21	1Meg	½		BTS-1Meg	
R22	5600Ω	½		BTS-5600	
R23	1000Ω	½		BTS-1000	
R24	39KΩ	1		BTS-39K	
R25	82KΩ	½		BTS-82K	
R26	27KΩ	½		BTS-27K	
R27	1Meg	½		BTS-1Meg	
R28	5600Ω	½		BTS-5600	
R29	1000Ω	½		BTS-1000	
R30	39KΩ	½		BTS-39K	
R31	10KΩ 5%	½		BTS-10K 5%	
R32	10KΩ 5%	½		BTS-10K 5%	
R33	2200Ω	½		BTS-2200	
R34	470KΩ	½		BTS-470K	
R35	68KΩ	½		BTS-68K	
R36	220KΩ	½		BTS-220K	
R37	33KΩ 5%	½		BTS-33K 5%	
R38	2200Ω	½		BTS-2200	
R39	39KΩ	½		BTS-39K	
R40	39KΩ	½		BTS-39K	
R41	680KΩ	½		BTS-680K	
R42	1500Ω	½		BTS-1500	
R43	22KΩ	½		BTS-22K	
R44	5600Ω	½		BTS-5600	
R45	8200Ω	½		BTS-8200	Note 2
R46	39KΩ	½		BTS-39K	Note 2
R47	8200Ω	½		BTS-8200	Note 3
R48	39KΩ	½		BTS-39K	Note 3
R49	6800Ω	½		BTS-6800	
R50	4700Ω	1		BTA-4700	
R51	470Ω	½		BTS-470	
R52	10KΩ	½		BTS-10K	
R53	2.2Meg	½		BTS-2.2Meg	
R54	100Ω	2			

Note 1. Some Models use a 22KΩ resistor in this application.
Note 2. Some Models replace R45 and R46 with a 47KΩ resistor.
Note 3. Some Models replace R47 and R48 with a 47KΩ resistor.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA PILOT PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC	300VCT @ .38A	6.3VAC @ 3A	6.3VAC @ .30A	55-30				

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA PILOT PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.062A	106Ω	3.95 Hy.	57-9	C-2303 ①			C-15X ①

① Drill one new mounting hole.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

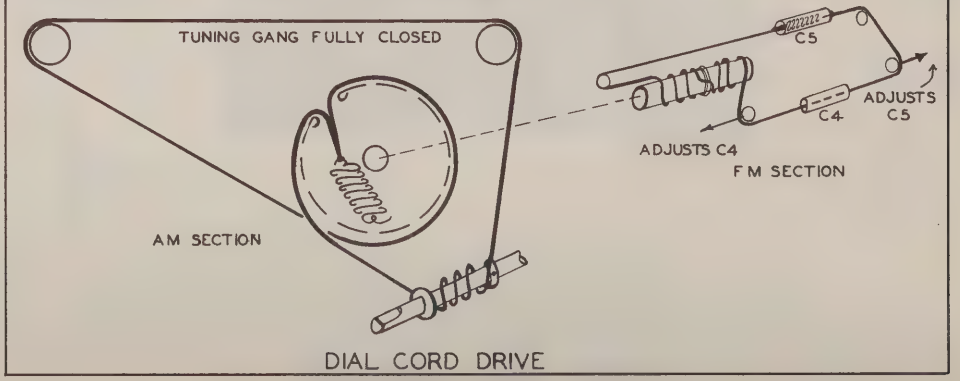
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PILOT PART No.	REPLACEMENT DATA MERIT PART No.	NOTES
L2	FM Ant. Coil	0Ω		70-78		
L3	RF Choke	1Ω		75-33		
L4	455KC Wave Trap	25Ω		79-102		
L5	FM RF Coil Assy.	0Ω		271-34		Tapped.
L6	RF Osc. Coil Assy.	0Ω		272-56		Tapped.
L7	AM Loop Ant.	0Ω	.1Ω	270-52		
L8	Fil. Choke	0Ω		75-19		
L9	RF Choke	1Ω		75-33		
L10	AM RF Coil	7Ω		71-38		Tapped @ 3.7Ω.
L11	AM Osc. Coil	2.5Ω		72-73		Tapped @ 1.3Ω.
L12	RF Choke	1Ω		75-33		
L13	Fil. Choke	0Ω		75-19		
L14	1st FM IF	.3Ω	.3Ω	273-149-1	FM-251	
L15	1st AM IF	8.5Ω	8.5Ω	273-129	BC-352	
L16	2nd FM IF	.4Ω	.4Ω	273-149-2	FM-251	
L17	2nd AM IF	8.5Ω	8.5Ω	273-129	BC-353	
L18	Radio Det.	1.8Ω	1Ω	279-72	FM-255	Tertiary winding - .3Ω.
L19	RF Choke	0Ω		75-19		
L20	RF Choke	0Ω		75-19		
L21	RF Choke	0Ω		75-19		

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA PILOT PART No.		NOTES
M1	Bayonet	6-8	.15	Brown		Type #47	Used in AM Position
M2	Bayonet	6-8	.15	Brown		Type #47	Used in AM Position
M3	Bayonet	6-8	.15	Brown		Type #47	Used in FM Position
M4	Bayonet	6-8	.15	Brown		Type #47	Used in FM Position
M5	Bayonet	6-8	.15	Brown		Type #47	Used in Phono Position
M6	Bayonet	6-8	.15	Brown		Type #47	Used in TV Position

MISCELLANEOUS

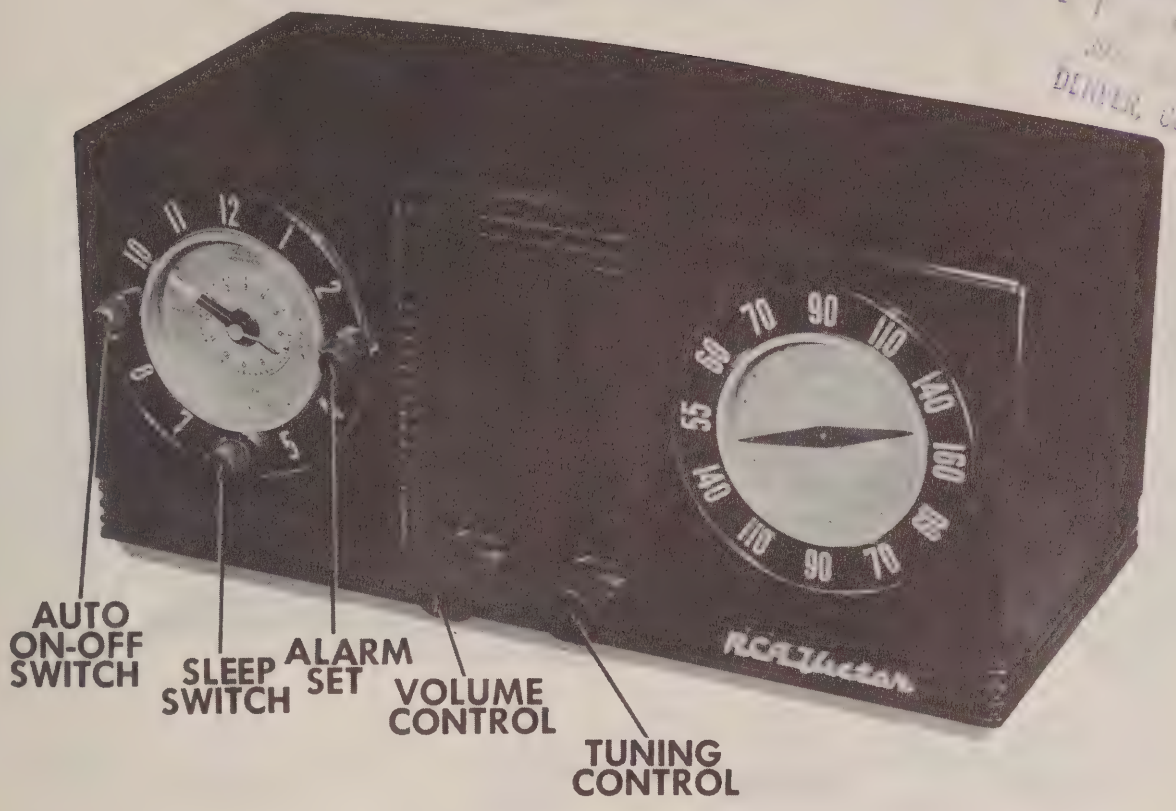
ITEM No.	PART NAME	PILOT PART No.	NOTES
M7	Tuning Capacitor	26-51	41-512MMF, 41-512MMF, 25-167MMF
M8A	Switch Wafer	100-81	Antenna-Pilot Lights
B	Switch Wafer	100-79	Oscillator-Mixer
C	Switch Wafer	100-80	Audio
M9	Switch	101-26	Pre-amplifier "In-Out" (DPDT Slide)
M10	Switch	100-77	AFC "Off-On" (SPST Rotary)
M11	Switch	100-77	Power "Off-On" (SPST Rotary)
A18	Trimmer	27-38	FM Osc., 5-30MMF
A19	Trimmer	27-39	FM RF, .5-3MMF



DIAL CORD DRIVE

PROPERTY OF
DENVER, COLORADO

RCA VICTOR MODELS
2C521, 2C522, 2C527 (Ch. RC1120, A)



RCA VICTOR MODELS
2C521, 2C522, 2C527 (Ch. RC1120, A)

RCA VICTOR 2C521

TRADE NAME	RCA Victor Models 2C521 (Ch. RC1120), 2C522, 2C527 (Ch. RC1120A)
MANUFACTURER	RCA Victor Div., Radio Corp. of America, Camden, N.J.
TYPE SET	AC Operated AM Superheterodyne Receiver with Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	.24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600 KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and chassis.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer parallel with base of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 1 (grid) of 12BA6 (V2) Low side to chassis.	455 KC (400~Mod)	Tune to quiet point near 1600 KC	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	High side to stator of rear section of tuning gang. Low side to chassis.	"	"	"	A3, A4	"
3.		Loop	1620 KC	Tuning gang fully open	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	1400 KC	Tune to 1400 KC signal	"	A6	Repeat steps 3 and 4 for optimum results.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

RCA VICTOR
MODEL 2C521 (Ch.RC1120)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RCA Victor PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	INSTALLATION NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det-AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲50	150	73520	AFH2-19		B018		FP216	TVL-3440	
B	■80	150								
C2	56		77116							
C3	6		77364				N750K-060			
C4	.047	400	73553	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C5	47		76348	SI47	D6-470	TM5Q5	GP1K-470	UC-5447	5GA-Q47	
C6	.01	200	73561	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C7A	.005									
B	250		♦77365		♦PC-71		♦1406-02		♦104C5	
C										
C8	.027	400	73554							
C9	.047	400	73553	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C10	.1	400	73551	P488-1	DF-104	PTE4P1		PT401	4TM-P1	

♦ Items C7A, C7B, C7C, R7A, R7B are combined in one unit.
When replacing items separately C7B, and C7C should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RCA Victor PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1 Meg	½	77359	Q13-137	AG-63-Z	AB-70	U-54	Volume
B	Shaft		Not Req.	NQ	RS-3/16	AK-8	DS-37	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: RCA Victor PART No.	IRC PART No.	NOTES
R2	39KΩ	½	503339	BTS-39K	
R3	100Ω	½	503110	BTS-100	
R4	3.3Meg	½	503533	BTS-3.3Meg	
R5	47KΩ	½	503347	BTS-47K	
R6	10 Meg	½	503610	BTS-10 Meg	
R7A	750KΩ	½	♦ 77365		
B	500KΩ	½			

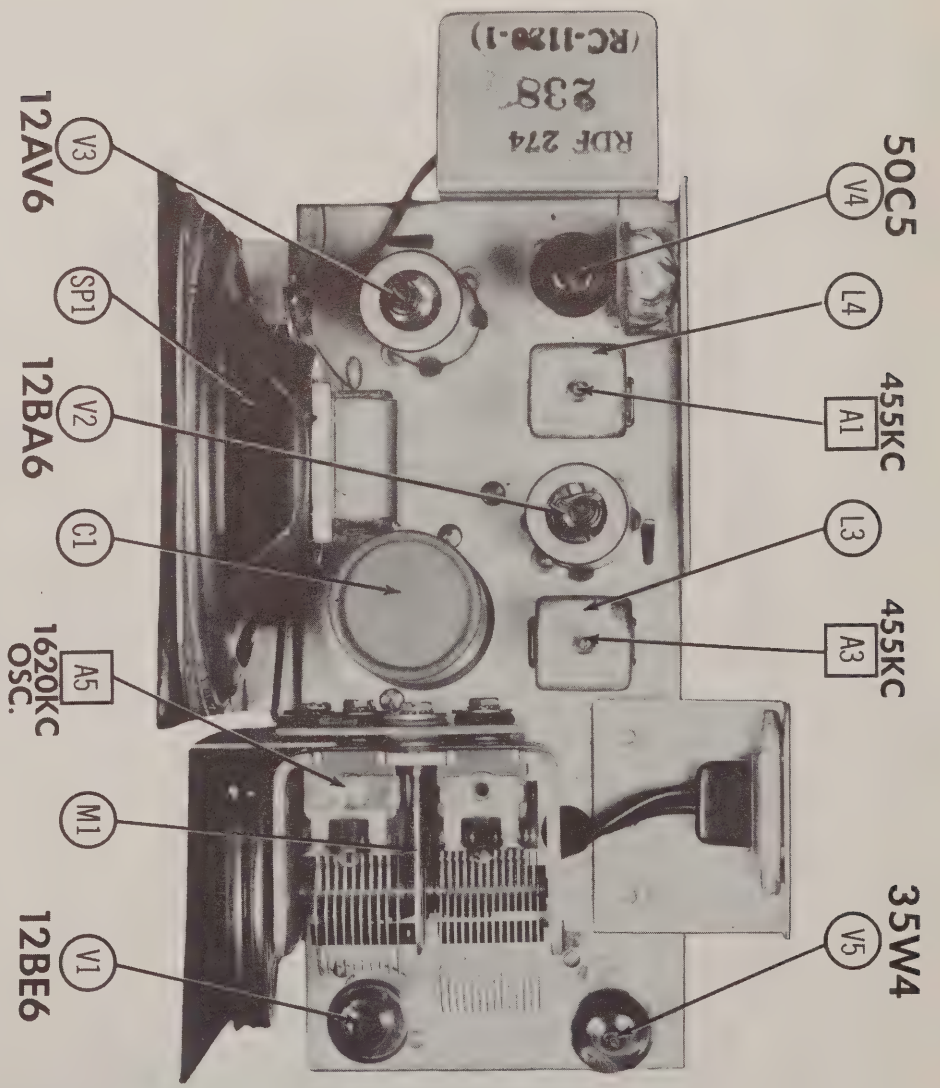
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: RCA Victor PART No.	IRC PART No.	NOTES
R8	150Ω	½	503115	BTS-150	
R9	1200Ω	1	513212	BTA-1200	
R10	33Ω	1			
R11	220KΩ	½	503422	BTS-220K	

♦ Items R7A, R7B, C7A, C7B, C7C are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T1	2.3KΩ	3.5Ω	230Ω Tap @ 17Ω	.7Ω	77362	A-3330 ①	A-3031 ①	Ro-3 ①	S-1X ①	① Drill one new mtg. hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

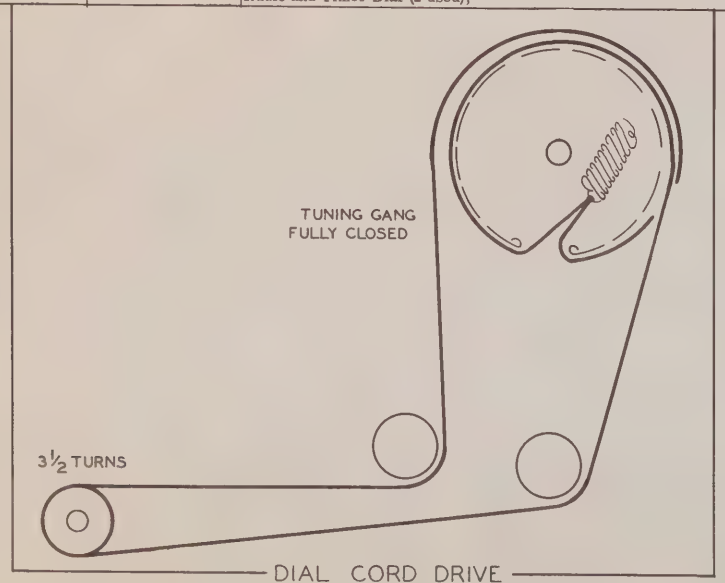
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	RCA Victor PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.5Ω	77226	ST-113 Mod. P4-X	4A07	

COILS (RF-IF)

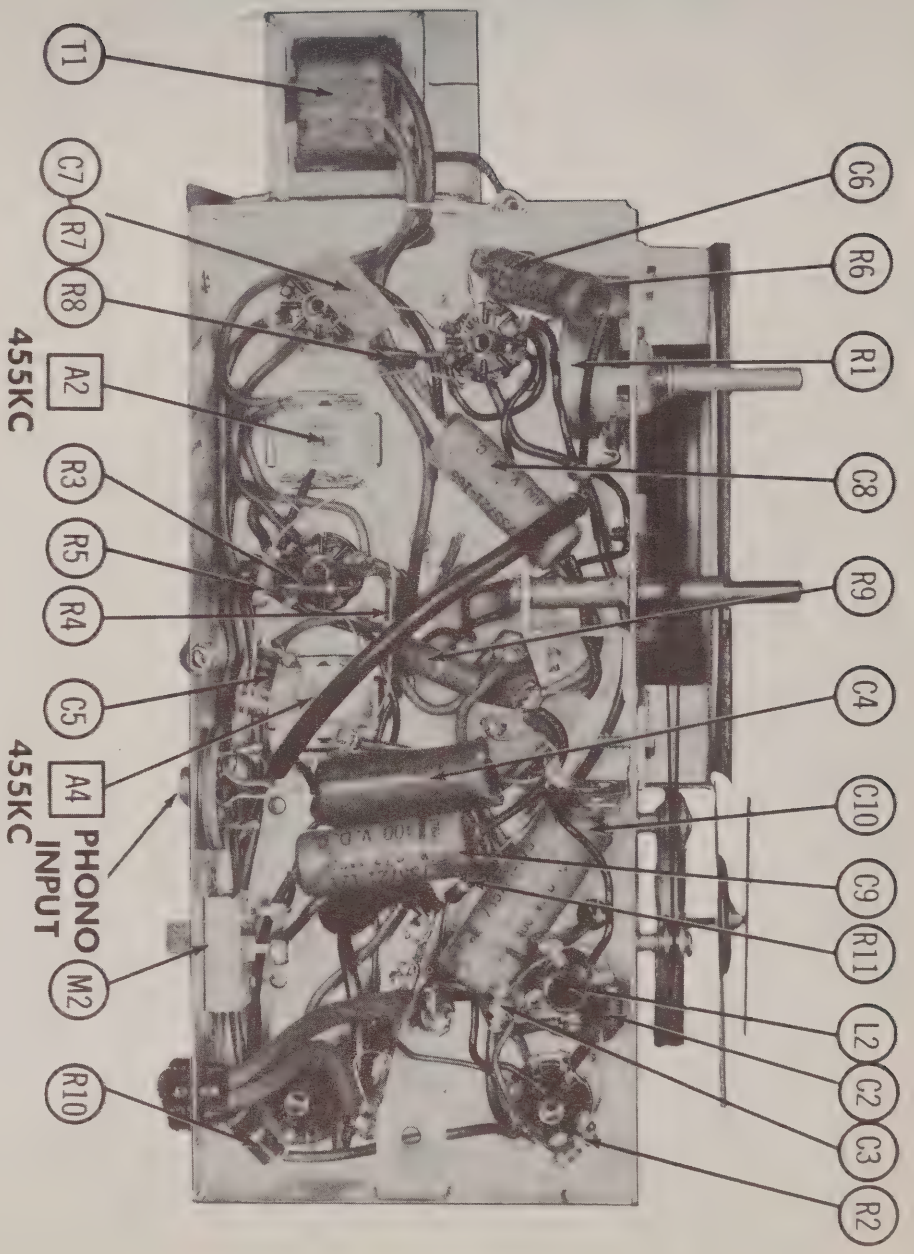
ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	RCA Victor PART No.	MERIT PART No.	
L1	Loop Ant.	2.4Ω		77367		
L2	Osc. Coil	.5Ω	6Ω	77356		
L3	Input IF	20Ω	12Ω	75486	BC-352	
L4	Output IF	13Ω	22Ω	75487	BC-355	

MISCELLANEOUS

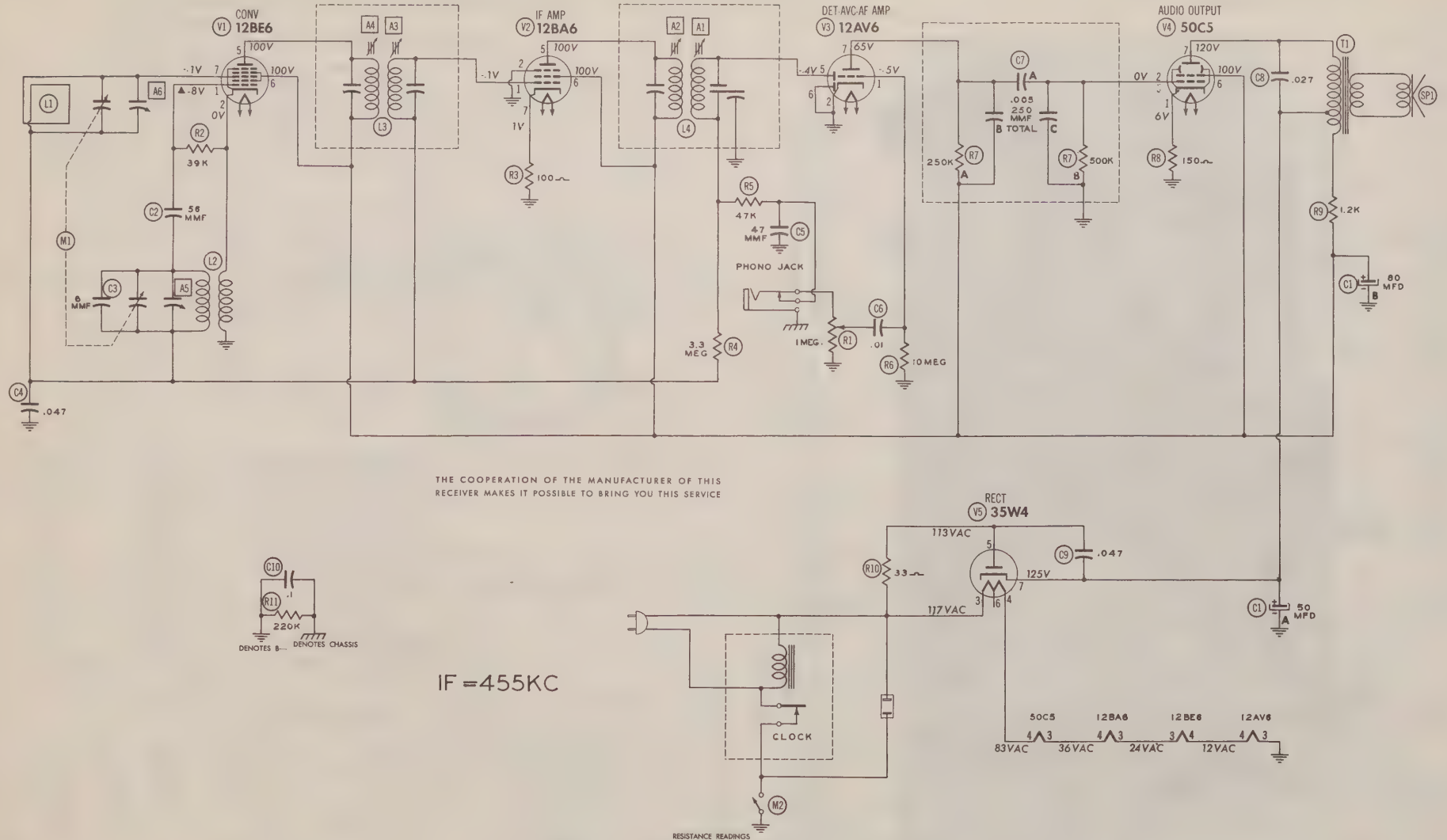
ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M1	Tuning Capacitor	77357	16-470MMF, 20-136MMF (Includes Drum)
M2	Switch	32875	Radio "Off/On",(SPST Slide)
	Cabinet	Y2463	Maroon, Model 2C521
	Cabinet	Y2464	Ivory, Model 2C522
	Cabinet	Y2465	White, Model 2C527
	Back	77367	Includes antenna loop and trimmer-Maroon-Model 2C521
	Back	77368	Includes antenna loop and trimmer-Ivory, Models 2C522, 2C527
	Baffle	X3304	With grille cloth, Model 2C521
	Baffle	X3305	With grille cloth, Models 2C522, 2C527
	Knob	77369	Timer Control, Model 2C521
	Knob	77370	Timer Control, Model 2C522
	Knob	77371	Timer Control, Model 2C527
	Knob	77373	Tuning and Volume, Model 2C521
	Knob	77374	Tuning and Volume, Model 2C522
	Knob	77375	Tuning and Volume, Model 2C527
	Window	77491	Radio and Timer Dial (2 used),



CHASSIS—BOTTOM VIEW



RCA VICTOR MODEL 2C521 (Ch. RC1120)



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	39KΩ	.5Ω	24Ω	12Ω	†1.2KΩ	†1.2KΩ	4.3Meg
V 2	12BA6	4.3Meg	0Ω	24Ω	36Ω	†1.2KΩ	†1.2KΩ	100Ω
V 3	12AV6	10 Meg	0Ω	0Ω	12Ω	1 Meg	0Ω	†250KΩ
V 4	50C5	150Ω	500KΩ	36Ω	86Ω	500KΩ	†1.2KΩ	†213Ω
V 5	35W4	INF	INF	120Ω	86Ω	153Ω	114Ω	1 Meg

* TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM PIN 7 OF V5.
NOTE : FILAMENT RESISTANCES MEASURED WITH RADIO "OFF-ON" SWITCH IN "OFF" POSITION

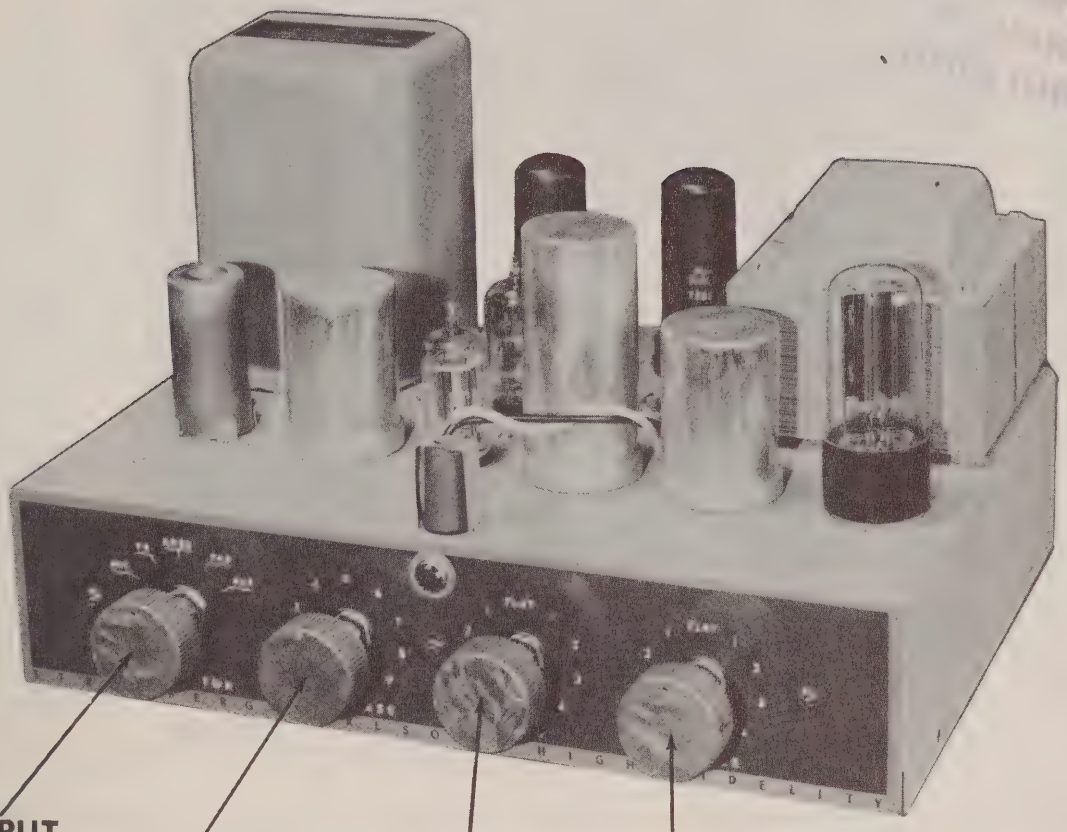
A-PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1953

194-11

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

STROMBERG-CARLSON
MODEL AR-410



STROMBERG-CARLSON
MODEL AR-410

TRADE NAME	Stromberg-Carlson Model AR-410
MANUFACTURER	Stromberg-Carlson Co., 100 Carlson Rd., Rochester, N. Y.
TYPE SET	AC Operated 4 Channel Audio Amplifier
TUBES (Six)	Types 12AU7 Pre. Amp., 12AX7 AF Amp., 12AT7 AF Amp. -Phase Inv., (2) 6F6 Audio Output, 5Y3GT Rectifier
POWER SUPPLY	105-125 Volts AC-50/60 Cycle RATING .73 Amp., @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

STROMBERG-CARLSON
MODEL AR-410

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: Stromberg-Carlson PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	INSTALLATION NOTES
V1	Pre-Amplifier	12AU7	12AU7	9A	
V2	AF Amplifier	12AX7	12AX7	9A	
V3	AF Amplifier - Phase Inverter	12AT7	12AT7	9A	
V4	Audio Output	6F6	6F6	7S	
V5	Audio Output	6F6	6F6	7S	
V6	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: Stromberg-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	30	450	111606	AFH2-65		B070		FP260	TVL-1820	
C2A	▲40	450	35590						R1004	
B	■30	350								
C	▲15	300								
D	50	50								
C3A	▲20	450	111609	AFH4-66		D089		FP426	TVL-4712	
B	■15	450								
C	▲20	25								
D	20	25								
C4	.047	400	110544	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C5	.1	400	110546	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C6	.033	400	110543	P688-033		PTE6S33		PT6133	6TM-S33	
C7	.01	400	110540	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C8	.0047	400	110538	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C9	.022	400	110542	P488-022	DF-203	PTE4S22		PT4122	4TM-S22	
C10	.001	400	110534	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C11	27		110485	SI27	D6-270		GP1K-270	UC-5427	5GA-Q27	
C12	.1	400	110546	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C13	.033	400	110543	P688-033		PTE6S33		PT6133	6TM-S33	
C14	.0047	400	110538	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C15	27		110485	SI27	D6-270		GP1K-270	UC-5427	5GA-Q27	
C16	470		110455	SI470	D6-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C17	.001	400	110534	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C18	.01	400	110540	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C19	.1	400	110546	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C20	330		110454	SI330	D6-331		GP2K-331	UC-5333	5GA-T33	
C21	.1	400	110546	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C22	.1	400	110546	P488-1	DF-104	PTE4P1		PT401	4TM-P1	

CONTROLS

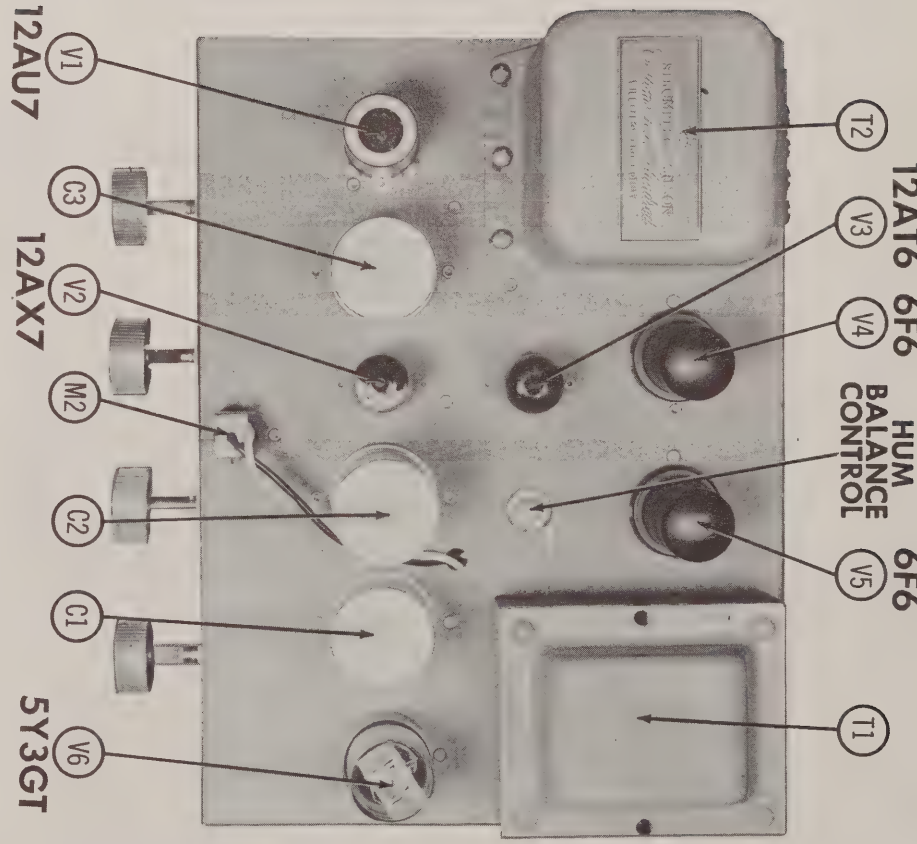
ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: Stromberg-Carlson PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	145622					Loudness
B	1 Meg	½						
C	100KΩ	½						
R2A	5 Meg	½	145619	Q13-141	AG-69-Z		U-65	Bass
B	Shaft		Not Req.	Not Req.	FS-3		Not Req.	Attach to R2A
R3A	5 Meg	½	145621	Q13-141	AG-69-Z		U-65	Treble
B	Shaft		Not Req.	Not Req.	FS-3		Not Req.	Attach to R3A
C	Switch		Not Req.	76-1	SWB		US-26	Attach to R3A
R4A	100Ω	2	46486	W-100	A43-100	VK-121	R100L	Hum balance -Wire Wound
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R4A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: Stromberg-Carlson PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R5	3.3Meg	½	149122	BTS-3.3Meg	
R6	470KΩ	½	28187	BTS-470K	
R7	47KΩ	½	28177	BTS-47K	
R8	47KΩ	½	28177	BTS-47K	
R9	470KΩ	½	28187	BTS-470K	
R10	3.3Meg	½	149122	BTS-3.3Meg	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R11	3.3Meg	½	149122	BTS-3.3Meg	
R12	68KΩ	½	28179	BTS-68K	
R13	220KΩ	½	28183	BTS-220K	
R14	27KΩ	½	28174	BTS-27K	
R15	3.3Meg	½	149122	BTS-3.3Meg	
R16	47KΩ	½	28177	BTS-47K	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Stromberg-Carlson PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R17	100KΩ	1/2	149385	BTS-100K	
R18	47KΩ	1/2	28177	BTS-47K	
R19	100KΩ	2		BTB-100K	Note 1
R20	100KΩ	1/2	149385	BTS-100K	
R21	10KΩ	1/2	28170	BTS-10K	
R22	330Ω	1/2		BTS-330	
R23	2200Ω	1/2		BTS-2200	
R24	33KΩ	1/2	28175	BTS-33K	
R25	470KΩ	1/2	28187	BTS-470K	
R26	10KΩ	1/2	28170	BTS-10K	
R27	1000Ω	1/2	28158	BTS-1000	
R28	47KΩ	1/2	28177	BTS-47K	
R29	3300Ω	1/2	28164	BTS-3300	
R30	220KΩ	1/2	28183	BTS-220K	
R31	47KΩ	1/2	28177	BTS-47K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Stromberg-Carlson PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R32	1 Meg	1/2		BTS-1 Meg	Note 2
R33	2700Ω	1/2	28163	BTS-2700	
R34	4700Ω	1/2	28166	BTS-4700	
R35	270KΩ	1/2	28184	BTS-270K	
R36	12KΩ	1/2	28171	BTS-12K	
R37	47KΩ	1/2	28177	BTS-47K	
R38	47KΩ	1/2	28177	BTS-47K	
R39	15KΩ	1/2	28172	BTS-15K	
R40	220KΩ	1/2	28182	BTS-220K	
R41	350Ω	5	46369	1-3/4A-350	
R42	220KΩ	1/2	28183	BTS-220K	
R43	47KΩ	2	149060	BTB-47K	
R44	47KΩ	2	149060	BTB-47K	
R45	2500Ω	5	46370	1 3/4A-2500	
R46	2.7Ω	1/2	149424		
R47	2.2Ω	1/2			Note 3
R48	680Ω	1/2	28156	BTS-680	

Note 1. Some models use a 47KΩ resistor in this application.
Note 2. Some models use a 470KΩ resistor is this application.
Note 3. Some models use a 2.7Ω resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Stromberg-Carlson PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC @ .73A	720VCT .090ADC	5VAC @ 2A	6.3VAC @ 2.4A	161773	PM8410	P-2953	PH-90	R-11B ①

① Drill new mounting holes

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA Stromberg-Carlson PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	8KΩCT	600Ω tap @ 150Ω, 16Ω, 8Ω 4Ω	506Ω CT	29.5Ω tap @ 9Ω, .98Ω, .68Ω, .5Ω SEC. 2 52Ω	161337			PC0-150		

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA Stromberg-Carlson PART No. FUSE	Stromberg-Carlson PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	AGC	3A. 250V.	25156		312003	342001	AGC-3	HKP

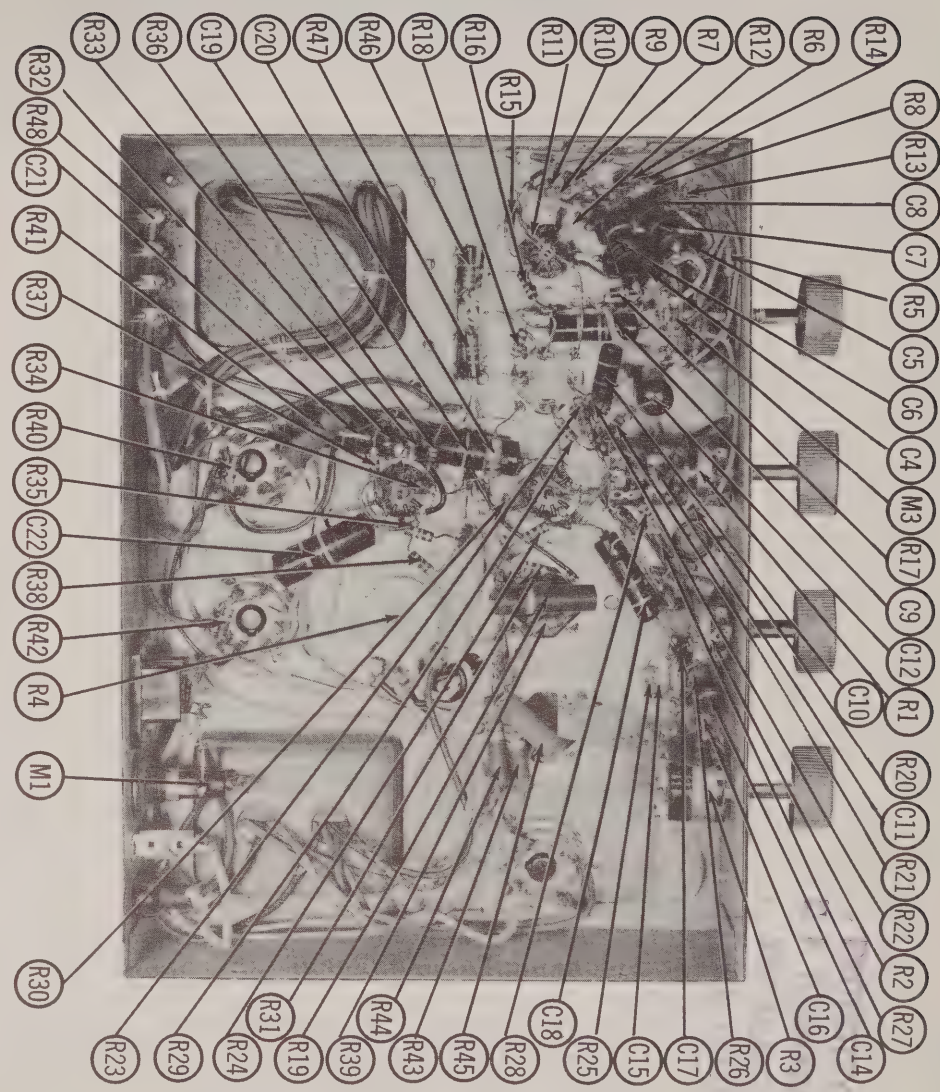
DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA Stromberg-Carlson PART No.		NOTES
M2	Bayonet	6-8	.15	Brown	30933		Type #47

MISCELLANEOUS

ITEM No.	PART NAME	Stromberg-Carlson PART No.	NOTES
M3	Switch	158642	Input Selector, (4P5T wafer)

CHASSIS—BOTTOM VIEW

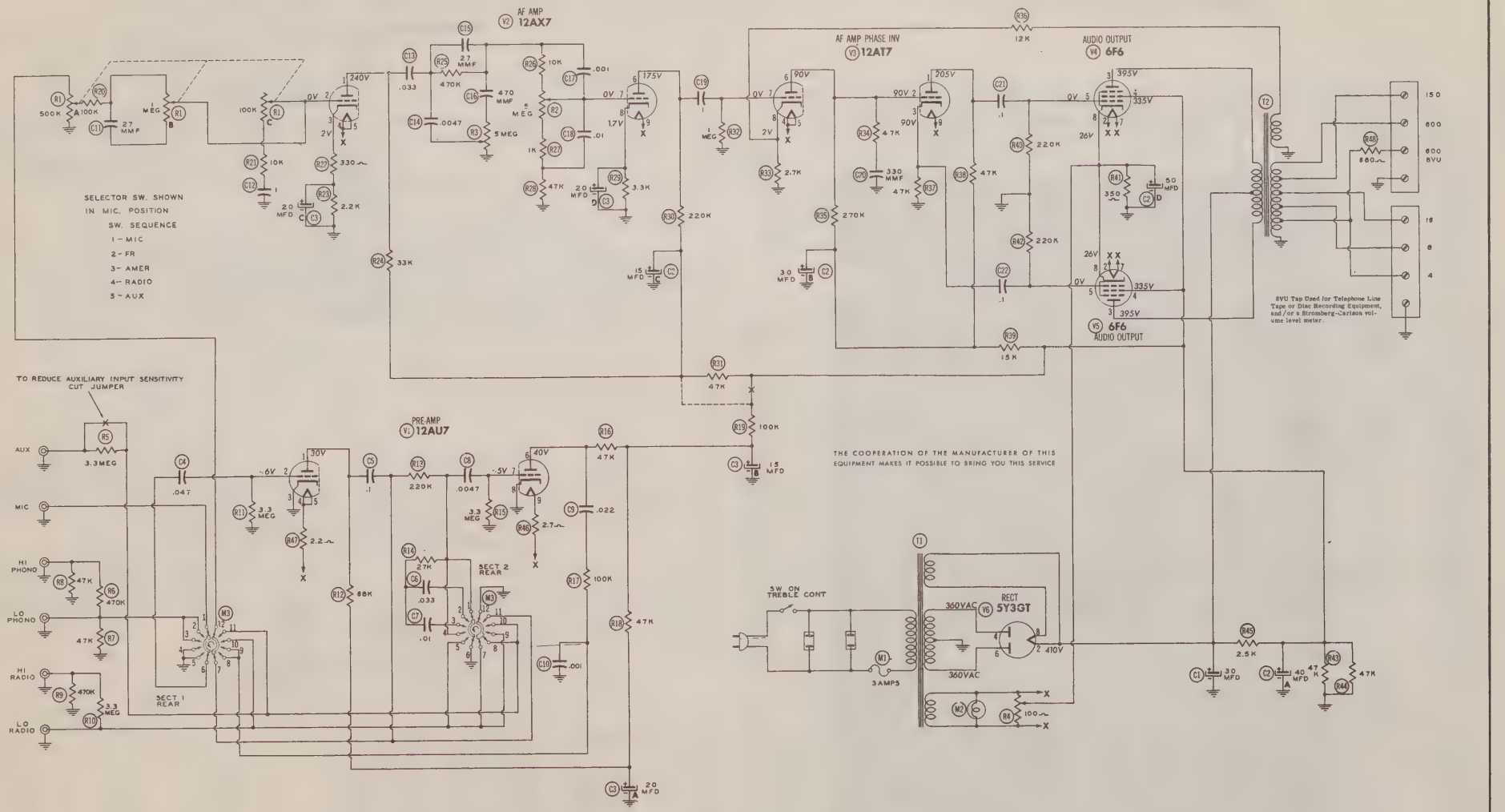


SET 194

FOLDER 12

STROMBERG-CARLSON MODEL AR-410

STROMBERG-CARLSON MODEL AR-410



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AU7	†217KΩ	3.3Meg	0Ω	400Ω	400Ω	†150KΩ	3.3Meg	0Ω	400Ω
V 2	12AX7	†83KΩ	1.1 Meg	2.5KΩ	400Ω	400Ω	†270KΩ	48KΩ	3.3KΩ	400Ω
V 3	12AT7	†65KΩ	†288KΩ	47KΩ	400Ω	400Ω	†288KΩ	1 Meg	2.2KΩ	400Ω
V 4	6F6	0Ω	400Ω	†249Ω	†2.5KΩ	220KΩ	†0Ω	400Ω	350Ω	
V 5	6F6	0Ω	400Ω	†257Ω	†2.5KΩ	220KΩ	INF	400Ω	350Ω	
V 6	5Y3GT	INF	26KΩ	INF	118Ω	INF	124Ω	INF	26KΩ	

† MEASURED FROM PIN 2 OF V6

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1953

194-12

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MODEL 2D1354

TRUETONE
MODEL 2D1354

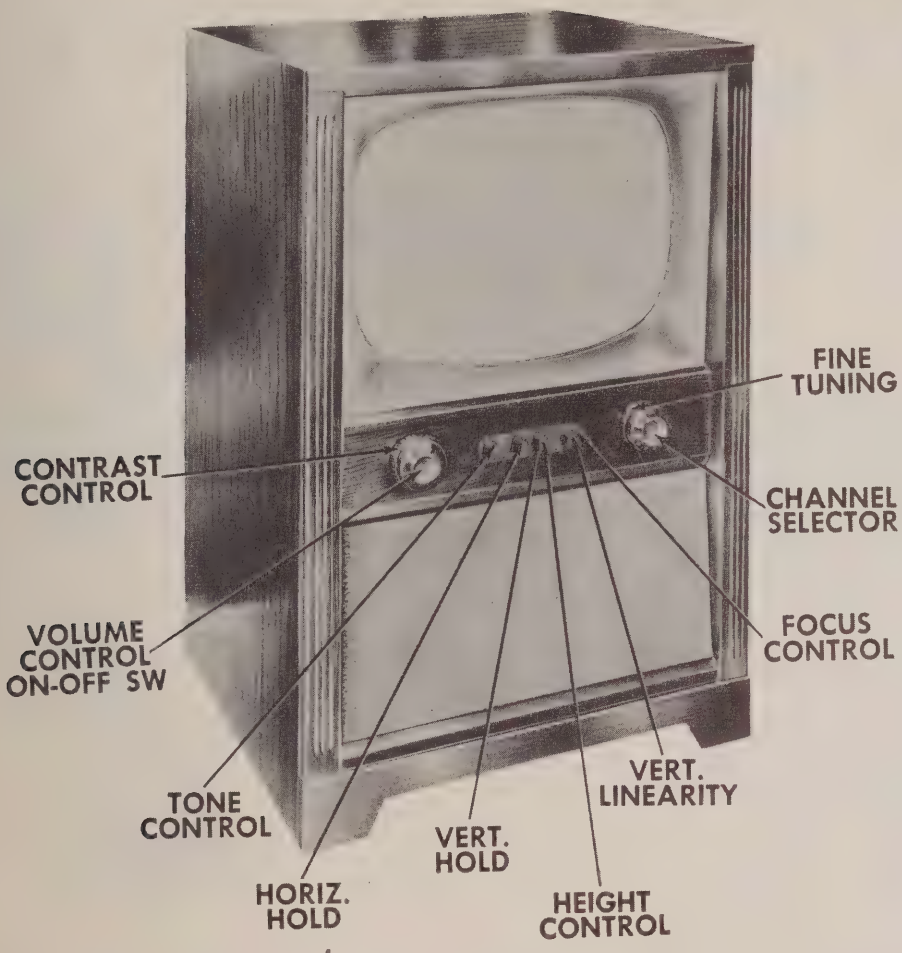
HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 2–53 SET 194 FOLDER 13

TRUETONE MODEL 2D1354

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



TRUETONE MODEL 2D1354

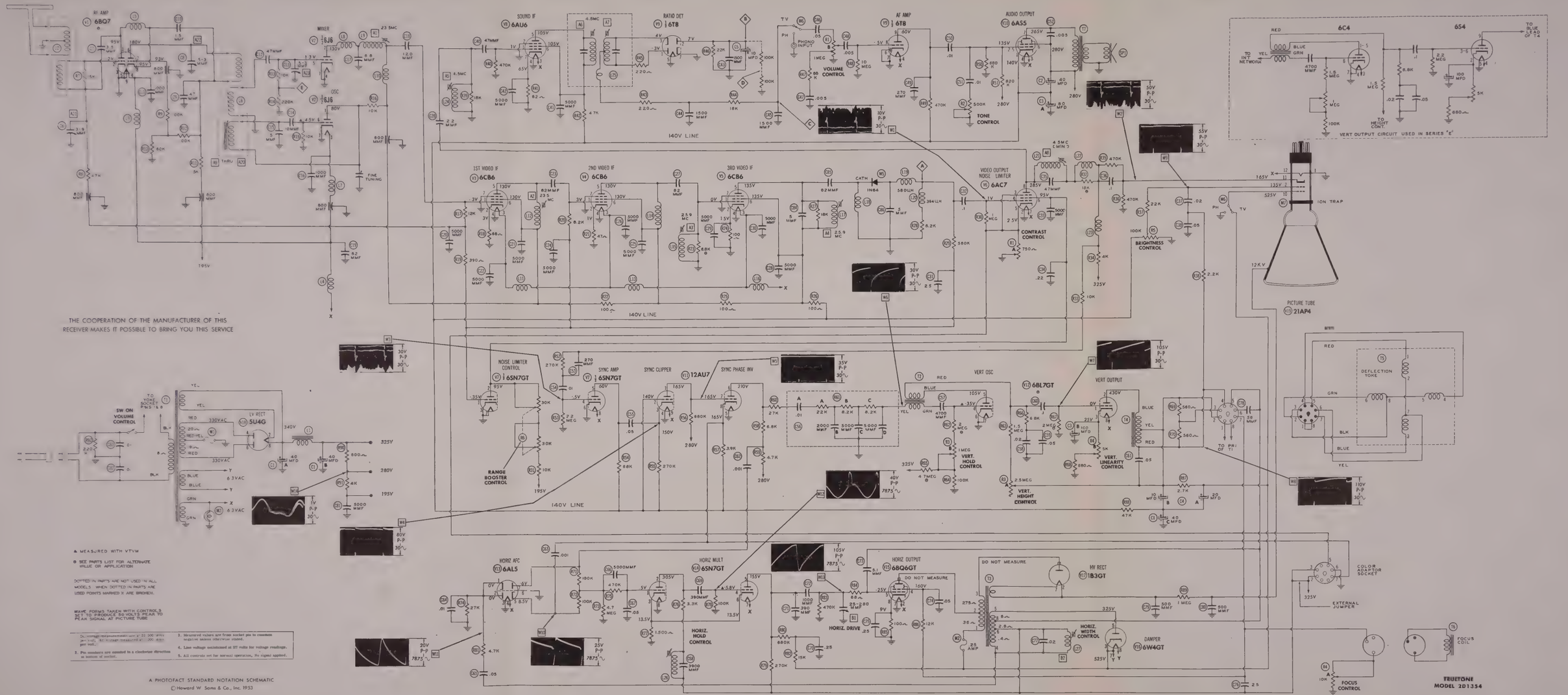
TRADE NAME	Truetone Model 2D-1354A (Ch. 9210P)
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Television Receiver
TUBES	Nineteen
POWER SUPPLY	110-120 Volts AC - 60 Cycle RATING 1.86 Amp. @ 117 Volts AC
TUNING RANGE–	Channel 2 thru 13, Video IF 26.75MC, Sound IF 22.25MC (Intercarrier)

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 13
Horizontal Sweep Circuit Adjustments 13
Parts List and Descriptions 14, 15, 16
Photographs
Cabinet - Rear view 13
Capacitor and Alignment Identification 4, 9
Chassis - top view 3
RF Tuner 10
Photographs (Con't)
Resistor and Inductor Identification 11, 18
Resistance Measurements 8
Schematic 2
Tube Failure Check Chart 5
Trouble Shooting Aids 12, 17
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top view) 5

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America



THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

▲ MEASURED WITH VTVM

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

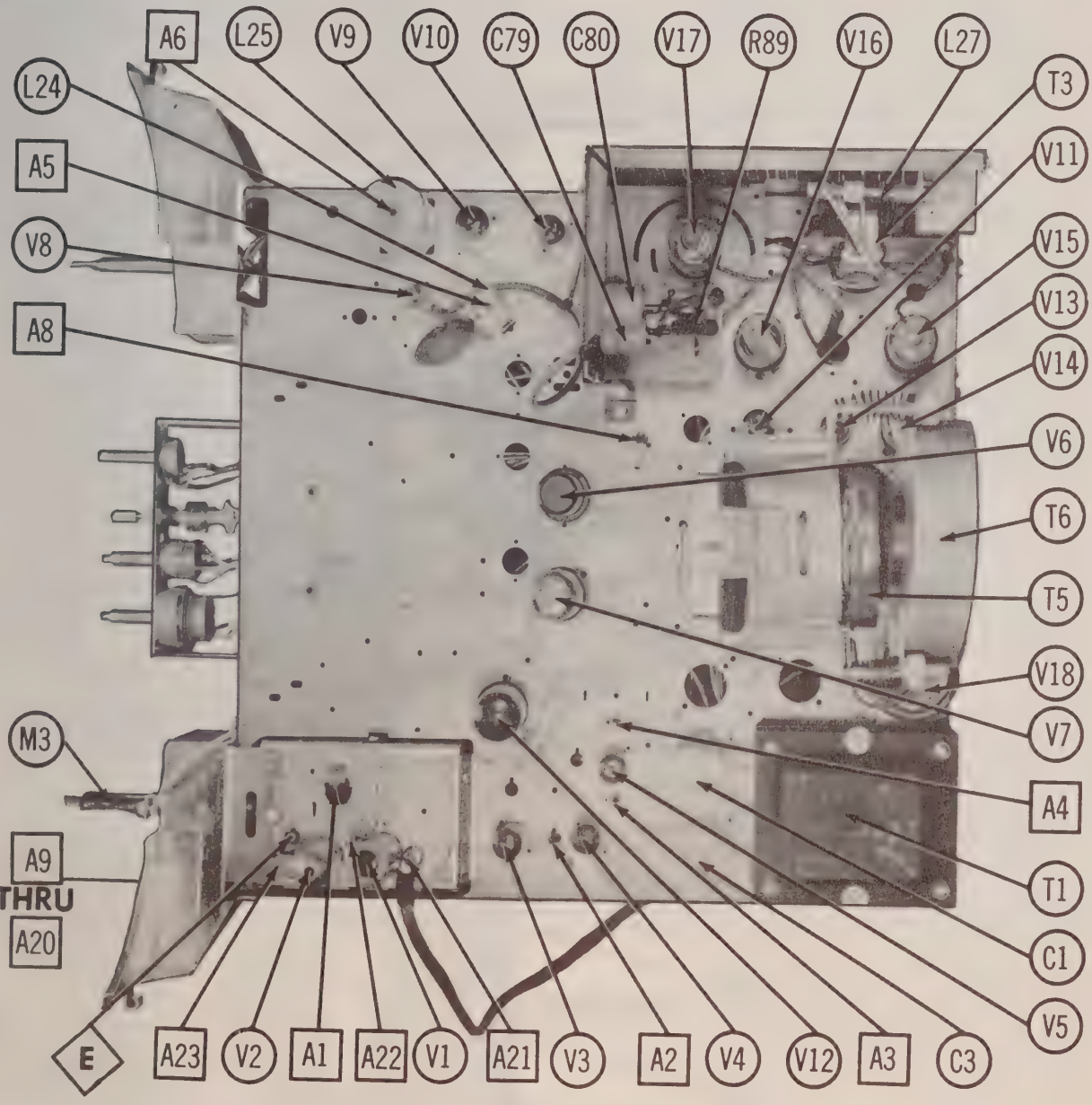
DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.

WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 80 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE

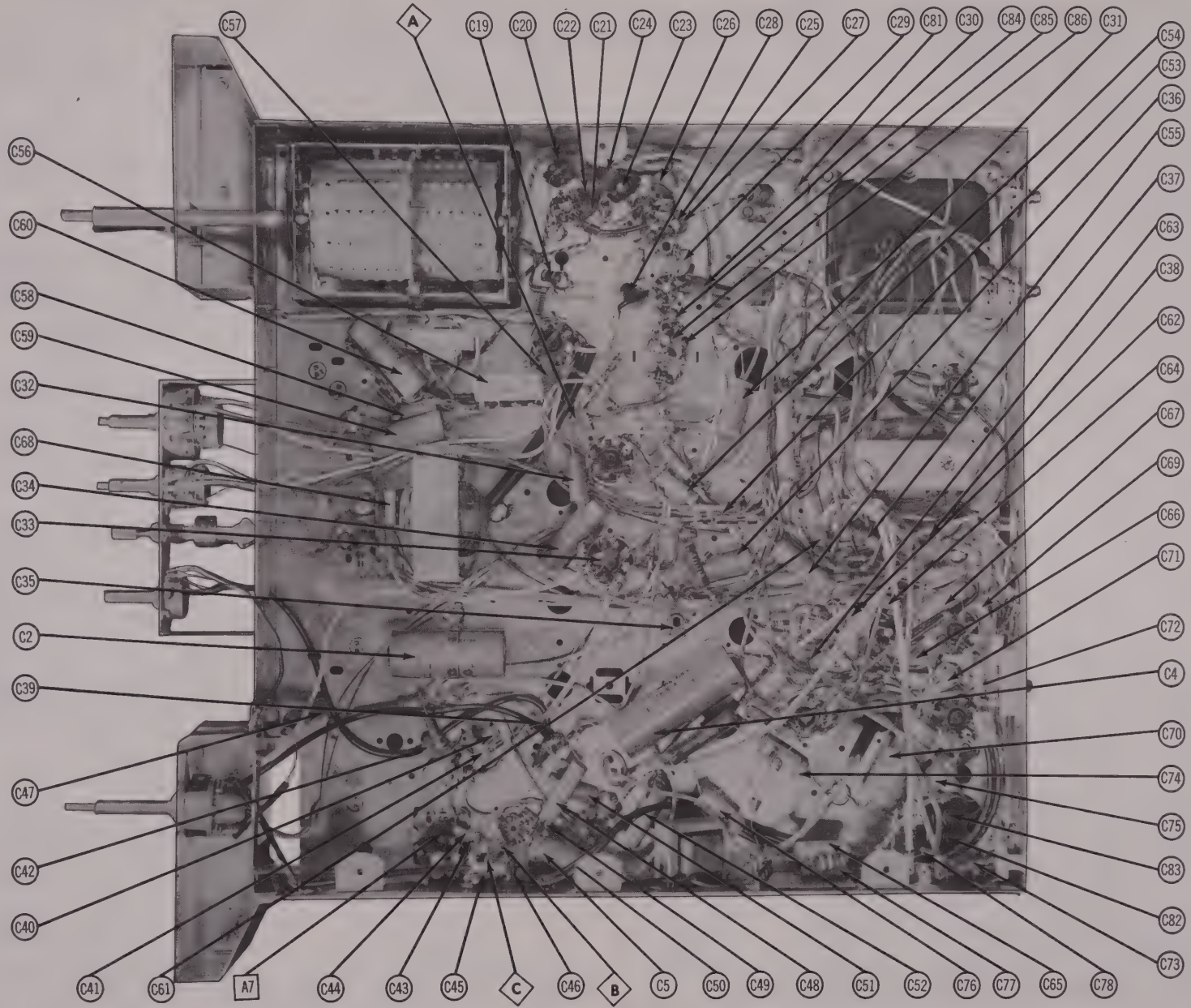
1. Voltage measurements are at 120 volts per line. All voltage measurements are DC unless otherwise noted.
2. Measured values are from socket pin to common negative unless otherwise stated.
3. Pin numbers are counted in a clockwise direction as bottom of socket.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, No signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W Sams & Co., Inc. 1953



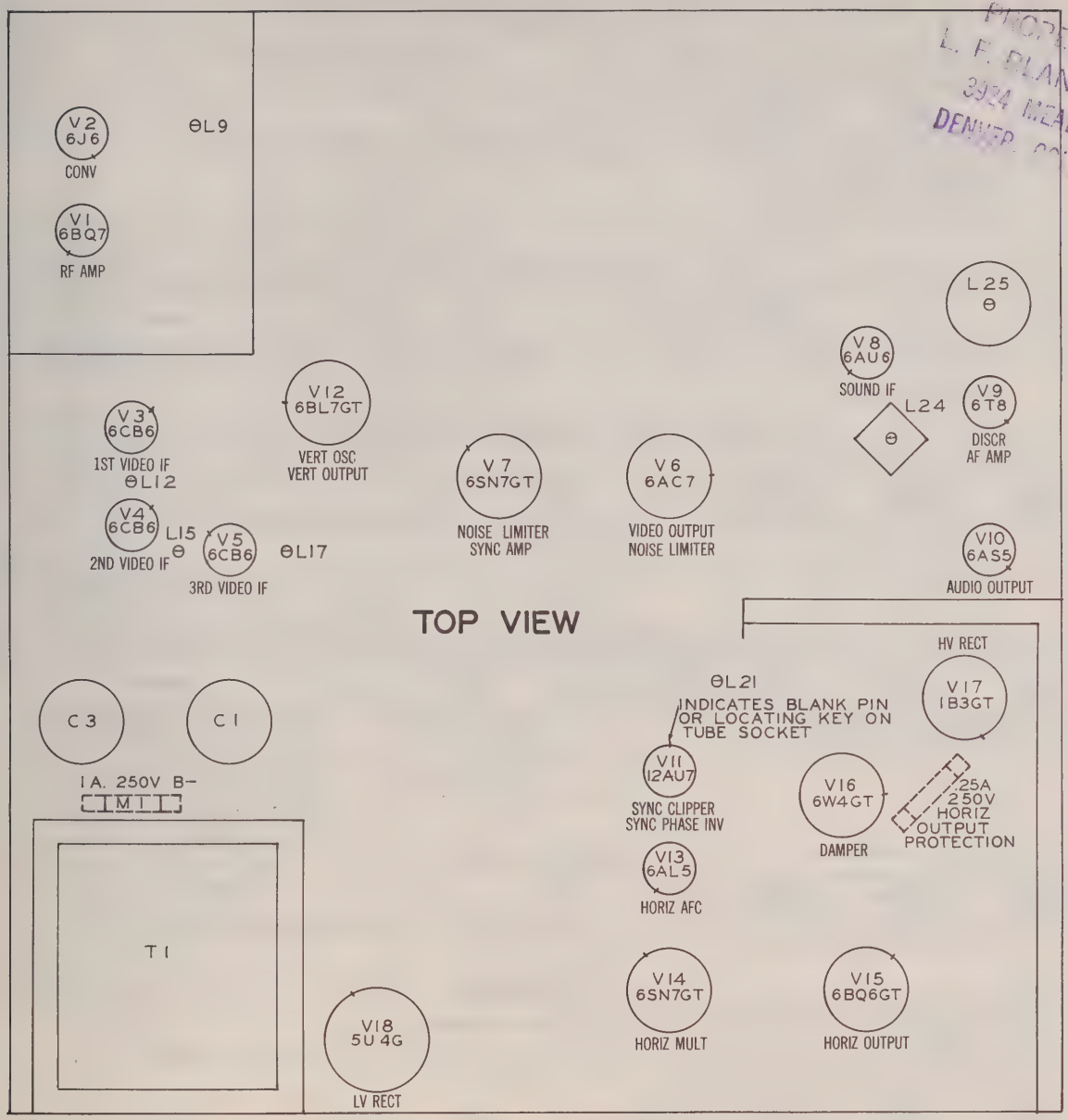
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V18 Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5, V6, V10
No pic, no sound has snow-V1, V2, V3
No pic, has sound, has raster-V6, V19
Has pic, no sound-V8, V9, V10
Overloaded picture-V7

SYNC FAILURE
No vert. sync-V11, V12
No horiz. sync-V11, V13, V14
No vert. or horiz. sync-V7, V11

SWEEP FAILURE
No raster, has sound-V14, V15, V16, V17 V19, Fuse (M2)
No vertical deflection-V12
Poor vert. linearity or foldover-V12
Poor horiz. linearity or foldover-V14, V15, V16
Narrow picture-V14, V15, V16, V17, V18
Vert. off freq. -V11 V12
Horiz. off freq. -V11, V13, V14

TRUETONE
MODEL 2D1354

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal multivibrator tube, V14, from its socket.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local ocillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the ungrounded side of C31. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	23.5MC (Unmod.)	Any	DC probe to point ◇A◇. Common to chassis.	A1, A2	Adjust for maximum deflection.
2.	"	"	25.9MC	"	"	A3, A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	25MC (10MC Swp)	22.25MC 26.75MC	Any	Vert. Amp. to point ◇A◇. Low side to chassis.		Check for response curve similar to Fig.1. If necessary retouch A1 thru A4 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point ◇B◇ to chassis. The junction of these two resistors is alignment point ◇D◇ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	.001MFD	High side to point ◇A◇. Low side to chassis.	4.5MC	Any	DC probe to point ◇B◇. Common to chassis.	A5, A6	Adjust for maximum deflection.
5.	"	"	"	"	DC probe to point ◇C◇. Common to point ◇D◇.	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.001MFD	High side to point ◇A◇. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point ◇B◇. Low side to chassis.	A5, A6	Disconnect stabilizer capacitor C5. Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
5.	"	"	"	"	"	Vert. Amp. to point ◇C◇. Low side to chassis.	A7	Reconnect capacitor C5. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A6 for maximum amplitude and straightness of of crossover lines.

4.5MC TRAP ADJUSTMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.001MFD	High side to point ◇A◇. Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru detector (Fig.4) to pin 11 of picture tube. Common to chassis.	A8	Adjust for **MINIMUM** deflection.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The channel oscillator adjustments are reached through a hole just to the right of the channel switch shaft.
The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point ◇A◇. Low side to chassis.	A9	Adjust to place sound marker as shown in Fig. 5. Video Marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A10	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A11	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A12	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A13	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A14	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A15	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A16	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A17	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A18	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A19	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A20	

ALIGNMENT INSTRUCTIONS (CONT.)

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (E). Low side to chassis.	A21, A22, A23	Adjust for response curve similar to Fig.6 with markers above 90%.
9.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response curve similar to Fig.6. If markers fall below 70% on any channel make slight compromise adjustments of A21, A22 and A23 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

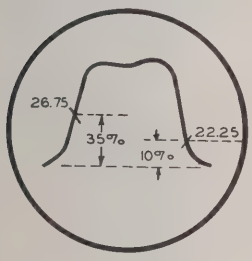


FIG.1

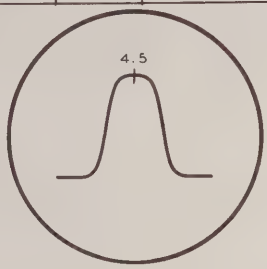


FIG. 2

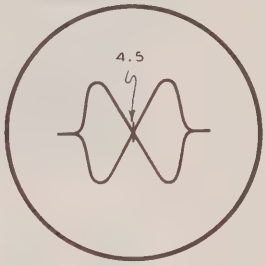


FIG. 3

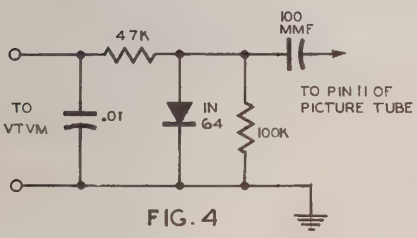


FIG. 4

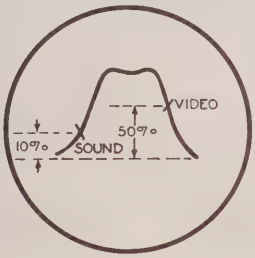


FIG. 5

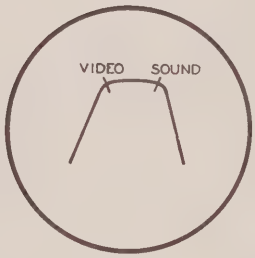


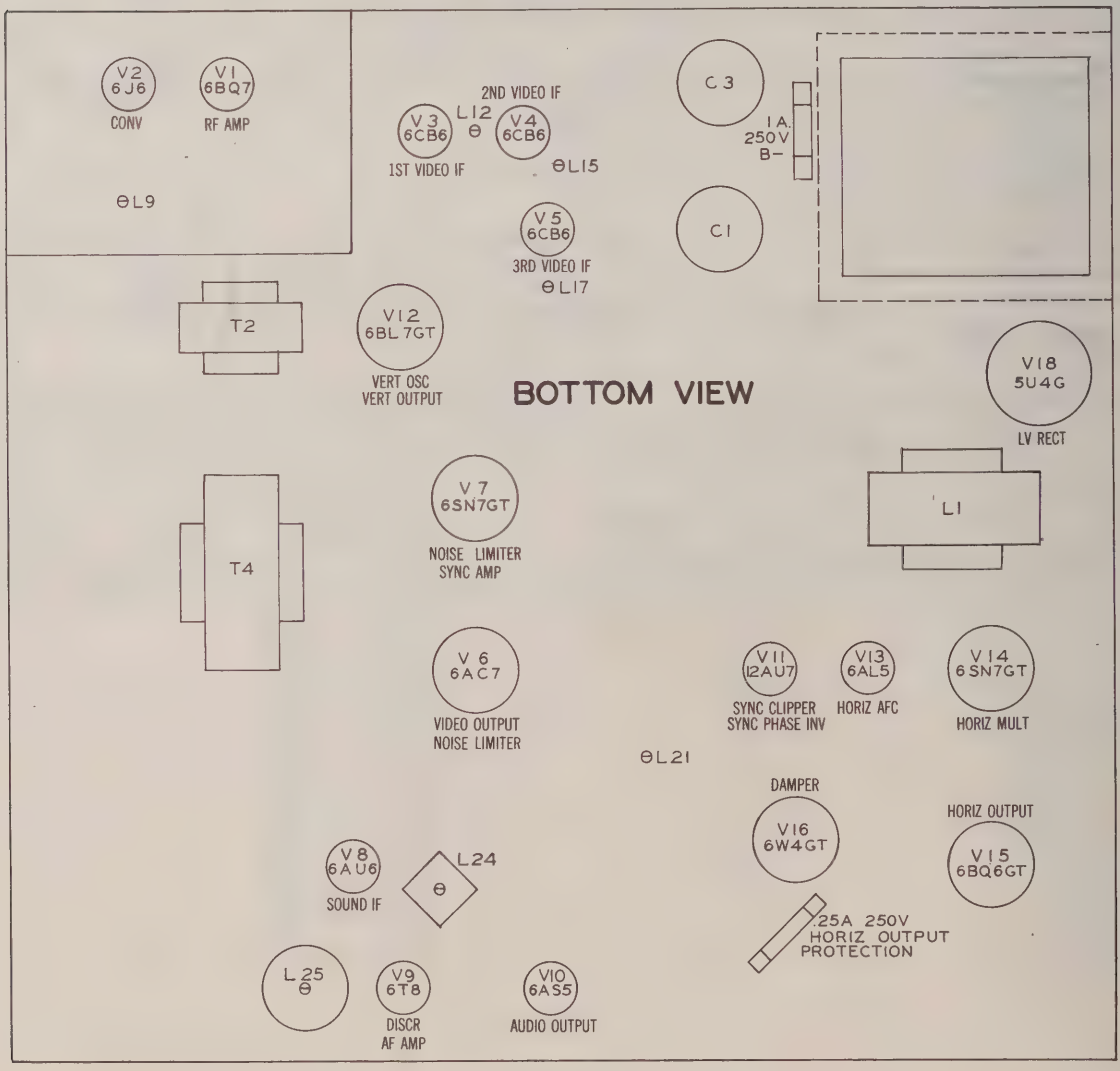
FIG.6

TRUETONE MODEL 2D1354

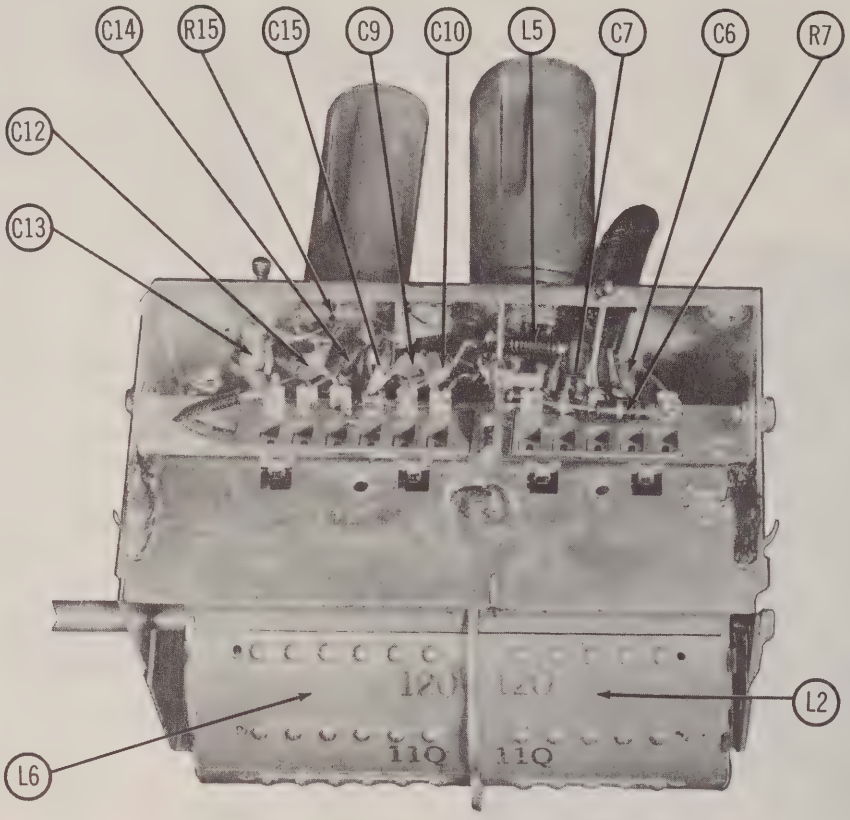
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7	INF	615KΩ	0Ω	.1Ω	0Ω	#6.2KΩ	165KΩ	INF	0Ω
V 2	6J6	†10.3KΩ	†300Ω	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6CB6	569KΩ	68Ω	.1Ω	0Ω	†300Ω	† 300Ω	0Ω		
V 4	6CB6	577KΩ	47Ω	.1Ω	0Ω	†200Ω	†200Ω	0Ω		
V 5	6CB6	.1Ω	100Ω	.1Ω	0Ω	†100Ω	†100Ω	0Ω		
V 6	6AC7	0Ω	0Ω	140Ω	1 Meg	140Ω	#16KΩ	.1Ω	#4.1KΩ	
V 7	6SN7GT	568KΩ	#16KΩ	0Ω	2.2Meg	†68KΩ	0Ω	0Ω	.1Ω	
V 8	6AU6	470KΩ	0Ω	.1Ω	0Ω	†4.7KΩ	†4.7KΩ	82Ω		
V 9	6T8	INF	22KΩ	INF	.1Ω	0Ω	0Ω	0Ω	10 Meg	†470KΩ
V 10	6AS5	80KΩ	375KΩ	.1Ω	0Ω	375KΩ	#673Ω	#1.1KΩ		
V 11	12AU7	#680KΩ	†0Ω	†270KΩ	0Ω	0Ω	#11.5KΩ	#680KΩ	†3.9KΩ	.1Ω
V 12	6BL7GT	2 Meg	■3.5KΩ	920Ω	2.4Meg	■2.6Meg	0Ω	0Ω	.1Ω	
V 13	6AL5	27KΩ	27KΩ	0Ω	.1Ω	4.8Meg	0Ω	4.8Meg		
V 14	6SN7GT	5.2Meg	#3.4KΩ	1.5KΩ	100KΩ	#270KΩ	1.5KΩ	.1Ω	0Ω	
V 15	6BQ6GT	INF	.1Ω	INF	#12KΩ	470KΩ	470KΩ	0Ω	100Ω	Top Cap ■36Ω
V 16	6W4GT	■0Ω	INF	750KΩ	INF	#76Ω	■0Ω	■0Ω	■.1Ω	
V 17	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								Top Cap ■311Ω
V 18	5U4G	INF	13.5KΩ	INF	20.5Ω	.1Ω	19.5Ω	INF	13.5KΩ	
V 19	21AP4	0Ω	80KΩ	Pin 10 ■0Ω	Pin 11 240KΩ	Pin 12 .1Ω				

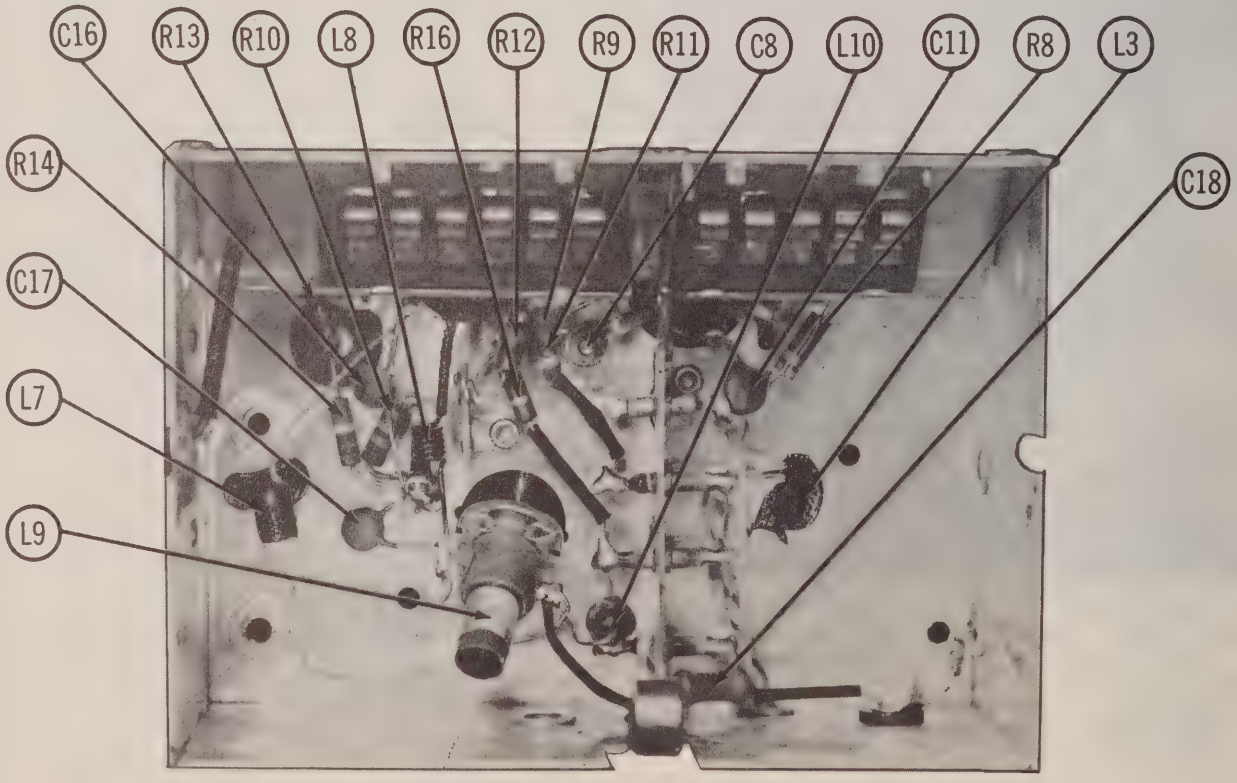
† MEASURED FROM PIN 1 OF V10
# MEASURED FROM PIN 8 OF V18
■ MEASURED FROM PIN 3 OF V16



TUBE PLACEMENT CHART

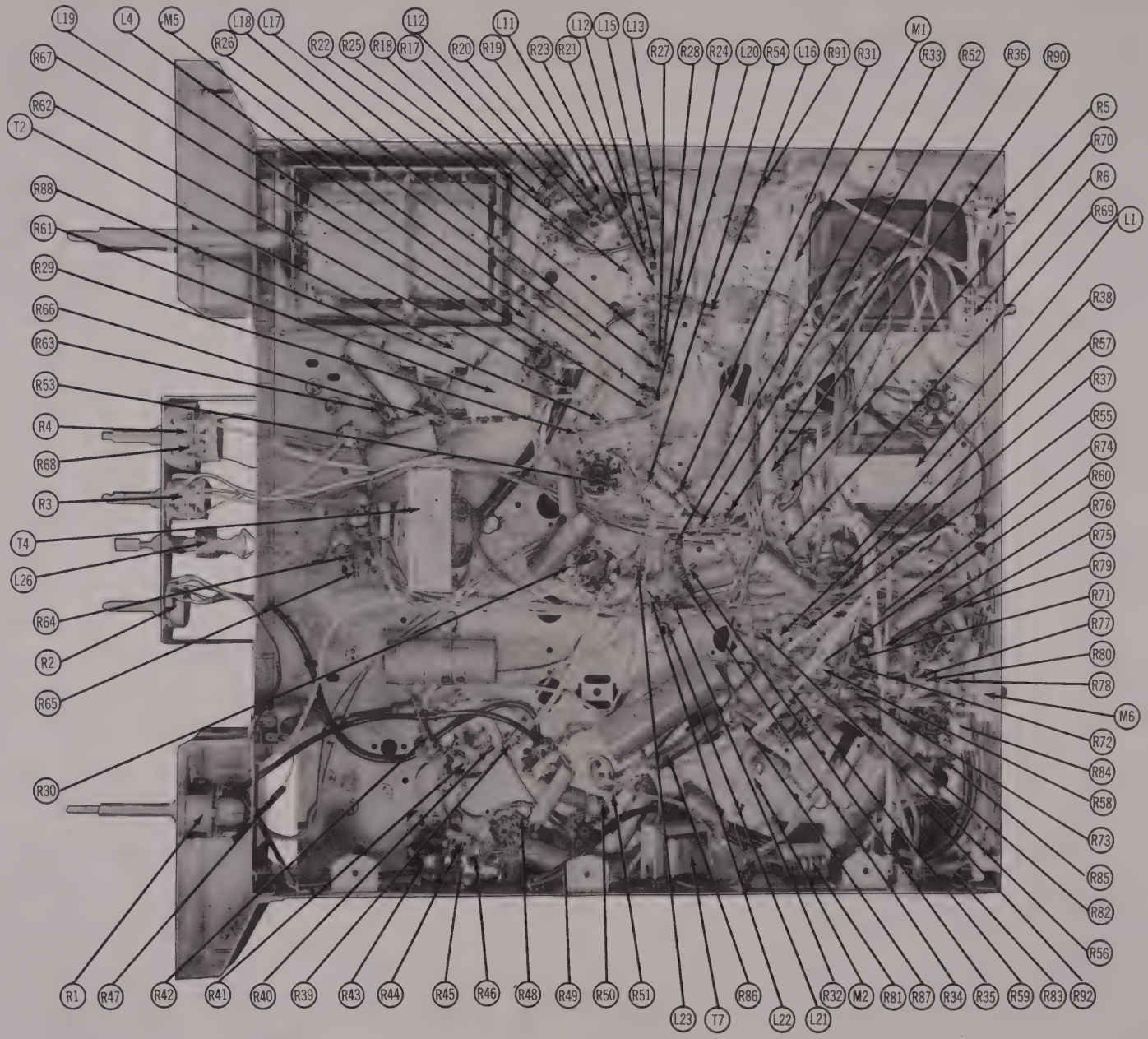


RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Check waveform W13;

If not satisfactory,	If satisfactory,
Substitute V14 and check associated components.	Substitute V15 and V16. Check yoke and associated components.

INSUFFICIENT SWEEP

Check setting of drive control.

Check waveform W13;

If not satisfactory,	If satisfactory,
Substitute V14 and check associated components.	Substitute V15 and V16. Check associated components. Check C73 for open by disconnecting one end. Sweep should decrease slightly if capacitor if OK. Check C74 and C77 for open.

DRIVE LINES

Check setting of drive control (B1). Substitute V15 and V16. Check C4B and C77 for open.

COMPRESSED LEFT SIDE

Substitute V15 and V16. Check T3 and associated components.

FOLDS

Substitute V16. Check associated components.

XMAS TREE EFFECT

Substitute V14. Check C68 and C69. Check associated components.

VERTICAL

LOSS OF SWEEP

Check waveform at W7;

If not satisfactory,	If satisfactory,
Substitute V12. Check associated components.	Check vertical output transformer.

INSUFFICIENT SWEFP

Check amplitude of waveform at W7;

If not satisfactory,	If satisfactory,
Substitute V12 and check components. Check C4A for open.	Check T4. Substitute V12.

COMPRESSED AT BOTTOM

Check C60 for leaky condition. Check C3B in vertical output tube cathode for open.

COMPRESSED AT TOP, STRETCHED AT BOTTOM

If adjustment of height and vertical linearity control does not correct this condition, check C58 and C59 for open.

FOLDS

Substitute V12 and check C3B.

SYNC

HORIZONTAL

LOSS OF SYNC

Check waveform at W10;

If not correct,	If correct,
Substitute V7 and V11. Check circuit components.	Check waveform at W11;

Check waveform W11;

If not correct,	If correct,
Check feedback network (C64, C65, R74 & R81)	Substitute V13 and V14. Check a associated components. Particularly C68 and L26.

CRITICAL HOLD

Substitute V13 and V14. If no change is noted, follow procedure outlined under horizontal, loss of sync.

PULLING PICTURE

Check V13 and associated components.

VERTICAL

LOSS OF SYNC

Check waveform W6;

If not correct,	If correct,
Substitute V11. Check associated components and integrater.	Substitute V12 and check associated components.

CRITICAL SYNC

Substitute V7 and V11. Check C54 and C55.

TRIGGERING

Substitute V12.

VIDEO

SOUND BARS

Check adjustment of A5 (4.5MC trap). Check setting of local oscillator and alignment of IF stages.

POOR RESOLUTION

Check alignment of tuner and IF stages. Substitute V6 and check associated components.

SMEAR

Substitute V6 and check circuit components.

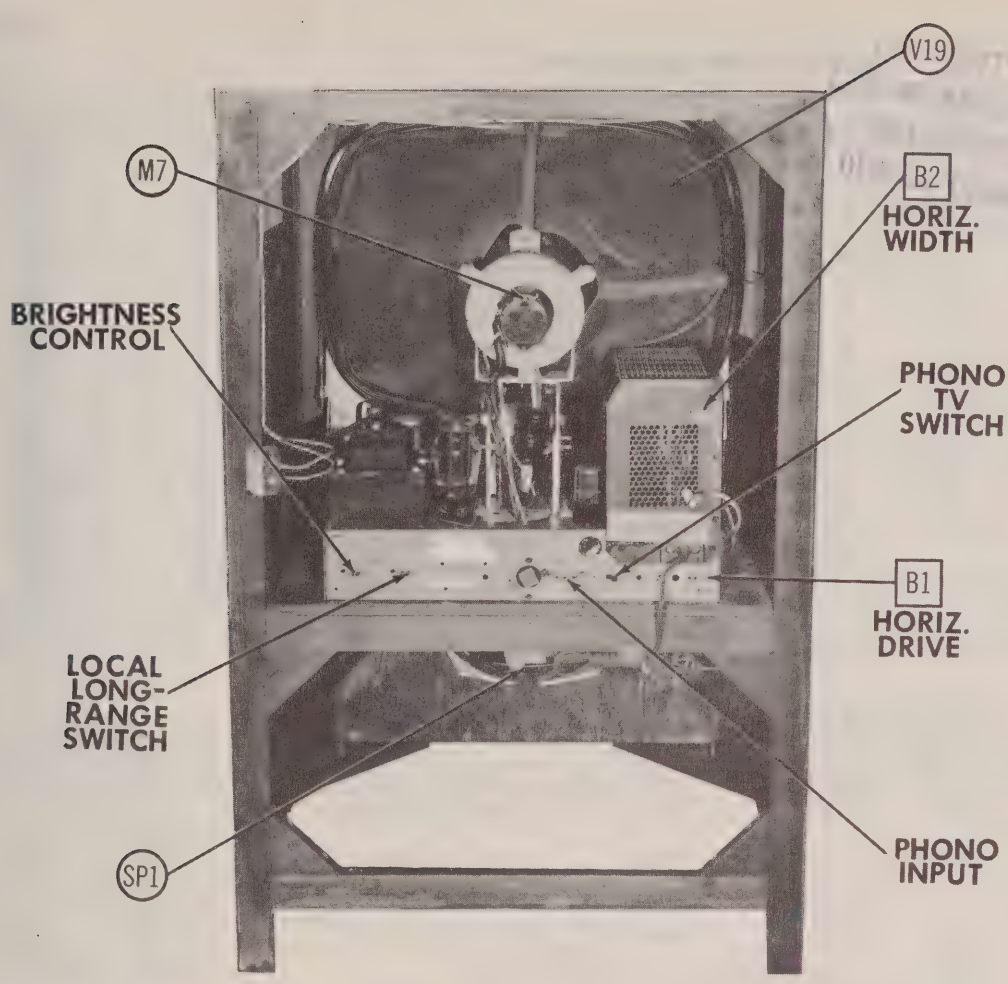
ONE WIDE BLACK BAR ACROSS THE PICTURE

Check tuner, IF and video amplifier tubes for leakage between filament and cathode.

POOR CONTRAST

Check waveform W2;

If distorted or weak,	If satisfactory,
Substitute V6 and check circuit components.	Check picture tube.



CABINET–REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal hold until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B1), counter-clockwise as far as possible without the presence of vertical white lines or compression of the center of the picture.

Adjust the width slug (B2) until the picture is slightly wider than enough to fill the picture mask horizontally.

AGC ADJUSTMENT

Tune to strongest TV signal available.

Adjust brightness and contrast controls for normal viewing.

Starting from maximum counter-clockwise position adjust AGC control clockwise until picture becomes unstable, then turn counter-clockwise just enought to eliminate the instability or bending of picture.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push on type control knobs from front panel.
2. Remove 7 wood screws. Remove rear cover.
3. Disconnect built-in antenna.
4. Remove 2 wood screws. Remove antenna bracket.
5. Disconnect speaker. Remove 4 speaker nuts. Remove speaker.
6. Remove 5 chassis bolts. Remove chassis.
   Note. Remove grd.wire to name plate before pulling chassis.

NOTE : FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.

PARTS LIST AND DESCRIPTIONS

PROPERTY OF
U.S. NAVY SHIPSHIP
DEN 30 - 1ST ST.
COLORADO

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1A	RF Amplifier	6BQ7	6BQ7	9AJ	
B	RF Amplifier	6B27	6B27	9AJ	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output - Noise Limiter	6AC7	6AC7		
V7	Noise Limiter Control - Sync Amplifier	6SN7GT	6SN7GT	8BD	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Detector - AF Amplifier	6T8	6T8	9E	
V10	Audio Output	6AS5	6AS5	7CV	
V11	Sync Clipper - Sync Phase Inv.	12AU7	12AU7	9A	
V12	Vert. Oscillator - Vert. Output	6BL7GT	6BL7GT	8BD	
V13	Horiz. AFC	6AL5	6AL5	6BT	
V14	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V15	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V16	Damper	6W4GT	6W4GT	4CG	
V17	HV Rectifier	1B3GT	1B3GT	3C	
V18	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: TRUETONE PART No.	SYLVANIA PART No.		RTMA BASE TYPE	NOTES
V18	21AP4	21AP4		12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	520434	AFH3-44		C035		FP377	TVL-3787	
B	■40	450								
C	▲40	250								
C2	40	300	160095	PRS450/40		BR4035		TC78	TVA-1611	
C3A	▲80	250	509002	AFH3-142		B060		FP375	TVL-3722	
B	▲100	50								
C4A	20	450	520641	PRS450/20-20		BRD2245		TCD75	TVA-2730	Orange Plain
B	10	450								
C5	10	150	505174	PRS150/12		BR1015		TC42	TVA-1406	
C6	3-9		509064		829-10					
C7	3.6		520721				NP0K-3R6			
C8	.5-3		507968		829-3			CT565A		
C9	47		520719	BPD-000047	D6-470	TM5Q5	GP1K-470	UC-5447	5GA-Q47	
C10	1.5		520720	SIL-5NP0	TCZ-1.5		NP0K-1R5		5TCCB-V15	
C11	1000		520735	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C12	47		520719	BPD-000047	D6-470	TM5Q5	GP1K-470	UC-5447	5GA-Q47	
C13	.5-3		507968		829-3			CT565A		
C14	10		520718	SI10N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C15	5		520717	SI5NP0	TCZ-5		NP0K-050	ZT-555	5TCCB-V47	
C16	1000		520735	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C17	6.8		520716	SI6.8NP0	TCZ-6.8		NP0K-6R8	ZT-5468	5TCCB-V68	
C18	120		513029	SI120	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C19	82		513016	SI82	D6-820		GP1K-820		5GA-Q82	
C20	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C21	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C22	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C23	82		513016	[illegible]	D6-820		GP1K-820		5GA-Q82	
C24	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C25	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C26	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C27	82		513016	SI82	D6-820		GP1K-820		5GA-Q82	
C28	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C29	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C30	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C31	.25	200	512045	P488-25		PJ2P25		PT4025	2TM-P25	
C32	.1	[illegible]	512033	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C33	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C34	.22	400	512223	P488-22		PTE4P22		PT4025	2TM-P22	
C35	47		513438	SI47NP0	TCZ-47			ZT-5447	5TCC-Q47	
C36	.1	400	512035	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C37	.02	[illegible]	512019	P688-02	DF-203	PTE6S2		PT612	6TM-S2	
C38	.05	600	512031	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C39	2.2		513001		TCZ-2.2		NP0K-2R2		5TCCB-V22	
C40	47		513002	SI47	D6-470	TM5Q5	GP1K-470	UC-5447	5GA-Q47	
C41	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C42	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C43	1500		513010	SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C44	1500		513010	SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C45	1500		513010	SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C46	.05	200	512027	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C47	.005	600	512007	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C48	.005	600	512007	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C49	270		513006	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C50	.01	400	512011	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C51	.01	200	512009	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C52	.005	[illegible]	512007	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C53	270		513006	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C54	.01	[illegible]	512013	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C55	.05	400	512029	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C56A	.01			P688-01		PTE6S1		PT611		
B	2000		*508062	BPD-002	*DD-103	TM5D2	†821-01	DC-522	‡5HK-S1	
C	5000			BPD-005	PC-100	TM5D5	1405-01	DC-525	101L1	
D	5000			BPD-005		TM5D5		DC-525		

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C57	4700	500	512533	1464-008		IDR5D5		MCB465	MS-25	
C58	.02	400	512019	P488-02	DF-203	PTE4S2		PT412	4TM-S2	
C59	.05	600	512308	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C60	.1	600	512037	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C61	.05	600	512027	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C62	.001	600	512001	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C63	.001	500	512001	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C64	.01	200	512009	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C65	.05	600	512031	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C66	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C67	.05	400	512027	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C68	3900	500	512540	1464-004		IDR5D4		MCB463	MS-24	
C69	390	500	512535	1469-0004		5R5T4		MCB243	MS-34	
C70	.25	600	512049	684 -25		PTE6P25		PT6025	6TM-P25	
C71	390	500	512535	1469-0004		5R5T4		MCB243	MS-34	
C72	1000	500	512515	1468-001	D6-102	IWSD1	GP2L-102	MC255	1FM-21	
C73	5.1	1500	513026					MCP550		
C74	.05	600	512031	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C75	.25	200	512045	P488-25		PJ2P25		PT4025	2TM-P25	
C76	.25	200	512045	P488-25		PJ2P25		PT4025	2TM-P25	
C77	.02	600	512019	P688-02	DF-203	PTE6S2		PT612	6TM-S2	
C78	56	1500	513027						20DK-T5	
C79	500	20000	508888	HV20C	TV3-502	MM-C20T5	413-501		20DK-T5	
C80	500	20000	508888	HV20C	TV3-502	MM-C20T5	413-501		20DK-T5	
C81	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C82	.01	400	512215	489ZGXY-01		PJ4S1		PT411	4TM-S1	
C83	.01	400	512255	489ZGXY-01		PJ4S1		PT411	4TM-S1	
C84	5		513432	SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C85	82		513016	SI82	D6-820		GP1K-820		5GA-Q82	
C86	5		513432	SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	

◆ Items C56A, C56B, C56C, C56D, R61A, R61B, R61C are combined in one unit.
* Install DD-103 in series with PC-100 input lead to replace original unit.
† Install 821-01 in series with 1405-01 input lead to replace original unit.
‡ Install 5HK-S1 in series with 101C1 input lead to replace original unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	750Ω	2	520292	QJ-341 *			WF751	Contrast-Wire Wound-Panel
B	1Meg	½					UR16-T25	Volume-Tapped ④ 200KΩ-Rear
C	Switch						US-28	Attach to R1B
R2A	500KΩ	½	520651	QH-133	AG-58-8	AB-59	U-50	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
R3A	2.5Meg	½	508893	QJ-223**	RTV-313		UP255L	Height-Panel
B	1Meg	½					UR16L	Vert. Hold- Rear
R4A	10KΩ	4	509302		RTV-341			Focus-Wire Wound-Panel
B	5000Ω	½						Vert. Linearity-Rear
R5A	100KΩ	½	520652	QH-128	AG-49-8	AB-40	SU-41	Brightness
B	Shaft		Not Req.	Not Req.	KFS-1/4	AK-1	Not Req.	Attach to R5A
R6A	30KΩ	½	520653	QH-121				Range Booster-Panel
B	30KΩ	½		M11-121				Range Booster- Rear

* CONCENTRIKIT EQUIVALENT - KIT K-3, BASE ELEMENTS & SHAFTS W17-105 & P3-131 (Panel)
B13-137K & R1-226 (Rear) & SWITCH 76-1.
** CONCENTRIKIT EQUIVALENT- KIT K-2, BASE ELEMENTS & SHAFTS B11-239 & P1-112 (Panel)
B11-137 & R1-115 (Rear).

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	NOTES
R7	15KΩ	½	510157	BTS-15K	
R8	47KΩ	½	510167	BTS-47K	
R9	100KΩ	½	510172	BTS-100K	
R10	160KΩ-5%	½	510774	BTS-160K-5%	
R11	1500Ω	½	510139	BTS- 1500	
R12	100KΩ-5%	½	510751	BTS-100K-5%	
R13	10KΩ	½	510154	BTS-10K	
R14	220KΩ	½	510179	BTS-220K	
R15	10KΩ	½	510154	BTS-10K	
R16	10KΩ	½	510154	BTS-10K	
R17	12KΩ-5%	½	510723		
R18	68Ω	½	510116		
R19	390Ω	½	510129	BTS-390	
R20	8200Ω	½	510153		
R21	47Ω	½	510112		
R22	100Ω	½	510119	BTS-100	
R23	6800Ω	½	510151		Note 3
R24	100Ω	½	510118	BTS-100	
R25	100Ω	½	510119	BTS-100	
R26	100Ω	½	510119	BTS-100	
R27	18KΩ	½	510159	BTS-18K	
R28	8200Ω	½	510153	BTS-8200	
R29	560KΩ	½	510186	BTS-560K	
R30	1 Meg	½	510191	BTS-1 Meg	
R31	10KΩ	2	510354	BTB-10K	
R32	18KΩ	½	510159	BTS-18K	Note 1
R33	10KΩ	½	510154	BTS-10K	
R34	4000Ω	5	510753	1 3/4A-4000	
R35	470KΩ	½	510184	BTS-470K	
R36	470KΩ	½	510184	BTS-470K	
R37	22KΩ	½	510160	BTS-22K	
R38	2200Ω	½	510142	BTS-2200	
R39	18KΩ	½	510159	BTS-18K	
R40	470KΩ	½	510184		
R41	82Ω	½	510117	BTS-82	
R42	4700Ω	1	510249	BTA-4700	
R43	220Ω	½	510124	BTS-220	
R44	18KΩ	½	510159	BTS-18K	
R45	220Ω	½	510124	BTS-220	
R46	22KΩ	½	510160	BTS-22K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	NOTES
R47	68KΩ	½	510170	BTS-68K	
R48	10Meg	½	510197	BTS-10Meg	
R49	470KΩ	½	510184	BTS-470K	
R50	680KΩ 5%	½	510748	BTS-680K-5%	
R51	820KΩ 5%	½	510747	BTS-820K-5%	
R52	270KΩ	½	510180	BTS-270K	
R53	2.2Meg	½	510193	BTS-2.2Meg	
R54	68KΩ	½	510169	BTS-68K	
R55	270KΩ	½	510180	BTS-270K	
R56	680KΩ	½	510187	BTS-680K	
R57	3900Ω 5%	½	510748	BTS-3900-5%	
R58	6800Ω	½	510151	BTS-6800	
R59	4700Ω 5%	½	510750	BTS-4700-5%	
R60	27KΩ	½	510182	BTS-27K	
R61A	22KΩ			BTS-22K	
B	8200Ω		*508062	BTS-8200	
C	8200Ω			BTS-8200	
R62	2Meg 5%	½	510769	BTS-2Meg-5%	Note 2
R63	1.5Meg 5%	½	510797	BTS-1.5meg-5%	
R64	100KΩ	½	510166	BTS-100K	
R65	4.7Meg	½	510768	BTS-4.7Meg	
R66	6800Ω	½	510151	BTS-6800	
R67	2Meg	½			
R68	680Ω	½	510134	BTS-680	
R69	560Ω	½	510132	BTS-560	
R70	560Ω	½	510132	BTS-560	
R71	100KΩ 5%	½	510751	BTS-100K-5%	
R72	100KΩ 5%	½	510751	BTS-100K-5%	
R73	4.7Meg	½	510195	BTS-4.7Meg	
R74	27KΩ	½	510182	BTS-27K	
R75	470KΩ	½	510184	BTS-470K	
R76	3300Ω	½	510145	BTS-3300	
R77	1500Ω	½	510139	BTS-1500	
R78	100KΩ	½	510172	BTS-100K	
R79	270KΩ	½	510180	BTS-270K	
R80	680KΩ	½	510187	BTS-680K	
R81	4700Ω	2	510248	BTB-4700	
R82	15KΩ	2	510357	BTB-15K	
R83	470KΩ	½	510184	BTS-470K	
R84	68Ω	½	510116		

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	NOTES
R85	100Ω	1	510218	BTA-100	
R86	12KΩ	5	510758	1-3/4A-12K	
R87	2700Ω	2	510344	BTB-2700	
R88	47KΩ	½		BTS-47K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	NOTES
R89	1Meg	2	510390	1-3/4A-600	
R90	600Ω	10	510741	1-3/4A-600	
R91	4000Ω	3	510773	1-3/4A-4000	
R92	2°0KΩ	½	510179	BTS-220K	

◆ Items R61A, R61B, R61C, C56A, C56B, C58C, C56D are combined in one unit
Note 1. Chassis containing an "A" in series designation use a 12KΩ resistor in this application.
Note 2. Chassis containing a "C" in series designation use a 1.8Meg resistor in this application.
Note 3. Chassis containing a "D" in series designation use a 4700Ω (5%) resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: TRUETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC ⑥ 1.86A	665VCT ⑥ .250ADC	5VAC ⑥ 3A	6.3VAC ⑥ 8.7A SEC. 4 6.3VAC ⑥ 1.12A	520487		P-3078	TP-356	R-39BC

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: TRUETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	153Ω	940Ω	508076	A-8125	A-3000 ①	TBO-1 ②	A-97X	Vert. Osc. Trans.
T3	31Ω tap ④ 36Ω	4Ω tap ④ .4Ω, 3.2Ω	520489	A-8130 ③	HVO-7 ④	TPB-5 ⑤ ⑥	D-14 ⑦	Horiz. Output Trans.
		SEC. 2 0Ω						
T4	800Ω tap ⑧ 9Ω	16Ω	509375	A-8123 ①	A-3037	TSO-5 ③	A-102X	Vert. Output Trans.
T5A	48Ω		115228 ⑨	DY-9	MDF-70 ⑩	TY-3	Y-17 ⑪	Horiz. Deflection Coils
B	48Ω							Vert. Deflection Coils
T6	12KΩ		162326 ⑨					Focus Coil

① Drill one new mounting hole.
② Mount on top of chassis.
③ Use with Width Coil WC-5.
④ Use with Width Coil MWC-1.
⑤ Drill new mounting holes.
⑥ Use Width Coil (with AGC winding) with approx. 4-29 Millihenry range.
⑦ Use with Width Coil WC-11.
⑧ Connect as Auto Trans.
⑨ Includes cable & plug.
⑩ Disconnect MDF-70 shunting resistors and capacitor.
⑪ Disconnect Y-17 shunting resistors and capacitor.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: TRUETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T7	4.3KΩ	3Ω	450Ω	.9Ω	509376 509378 ①	A-3877 ②	A-2930	RO-8 ②	S-5X	① Alternate audio output. ② Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: TRUETONE PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	6 x 9"	PM	3Ω	508174	ST-810 Mod. P69-V	69A2	

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (D. CURRENT 1000 M.A.)	REPLACEMENT DATA: TRUETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.250ADC	73Ω	2.9 Hy.	508341	C-2325	C-2991 ①	TR-3300 ①	

① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: TRUETONE PART No.	MERIT PART No.	NOTES
L2	Ant. Coil	0Ω	0Ω	520702		Channel 2
L3	Fil. Choke	0Ω		520518		
L4	Fil. Choke	0Ω		507584		
L5	Neutralizing Coil	0Ω		520701		
L6	RF, Mixer Grid & Osc. Coil	0Ω		520722		Channel 2
L7	Fil. Choke	0Ω		520520		
L8	RF Choke	0Ω		520714		
L9	1st. Video IF	.9Ω		520734	TV-103 *	Includes slug, part #509062
L10	RF Choke	1.2Ω		520715		
L11	Fil. Choke	0Ω		507584		
L12	2nd. Video IF	.1Ω		507343	TV-103 *	Less slug part #507357
L13	Fil. Choke	0Ω		507584		

TRUETONE MODEL 2D1354

PARTS LIST AND DESCRIPTIONS (Continued)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	TRUETONE PART No.	MERIT PART No.	
L14	RF Choke	2.2Ω		507367		
L15	3rd. Video IF	.1Ω		507343	TV-102 *	Less slug, part #507357
L16	Fil. Choke	0Ω		507584		
L17	4th. Video IF	.1Ω		507343	TV-103 *	Less slug, part #507357
L18	RF Choke	2.2Ω		507367		
L19	Series Peaking Coil	16Ω		509340	TV-188	580 Microhenries
L20	Shunt Peaking Coil	6.5Ω		509342	TV-188	394 Microhenries
L21	4.5MC Trap	1.8Ω		509603	TV-151	Includes slug, part #507357
L22	Series Peaking Coil	9.5Ω		520689 †	TV-185	
L23	Shunt Peaking Coil	6.5Ω		509340 ▲	TV-188	
L24	Sound IF	1.4Ω		509378		
L25	Ratio Det.	3.8Ω	.7Ω CT	509706	TV-115 ■	Tertiary Winding - .45Ω
L26	Horiz. Osc.	85Ω		508967	TV-163	Includes slug, part #508963
L27	Width Coil	1.3Ω		509361	MWC-2	Includes slug, part #507429

* Enlarge mounting hole.
■ Use adaptor plate.
† Chassis containing an "A" in series designation use part #509341 in this application.
▲ Chassis containing an "A" in series designation use part #509342 in this application.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			TRUETONE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG (P/T)	1A 250V	509517		318001		GJV-1	
M2	3AG (P/T)	1/4A 250V	508063		318.250		GJV-1/4	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					TRUETONE PART No.		
M3	Bayonet	6-8	.15	Brown	118921		Type #47

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M4	RF Tuner	W520645	Complete
M5	Crystal	509386	Video Detector (1N64)
M6	Switch	520563	Phono-TV Selector (DPDT Slide)
M7	Ion Trap	509688	
	Trimmer	520127	Horiz. Drive 25-280MMF
	Ant. Coil	520703	Channel 3
	Ant. Coil	520704	Channel 4
	Ant. Coil	520705	Channel 5
	Ant. Coil	520706	Channel 6
	Ant. Coil	520707	Channel 7
	Ant. Coil	520708	Channel 8
	Ant. Coil	520709	Channel 9
	Ant. Coil	520710	Channel 10
	Ant. Coils	520711	Channel 11
	Ant. Coils	520712	Channel 12
	Ant. Coils	520713	Channel 13
	RF, Mixer Grid & Osc. Coil	520723	Channel 3
	RF, Mixer Grid & Osc. Coil	520724	Channel 4
	RF, Mixer Grid & Osc. Coil	520725	Channel 5
	RF, Mixer Grid & Osc. Coil	520726	Channel 6
	RF, Mixer Grid & Osc. Coil	520727	Channel 7
	RF, Mixer Grid & Osc. Coil	520728	Channel 8
	RF, Mixer Grid & Osc. Coil	520729	Channel 9
	RF, Mixer Grid & Osc. Coil	520730	Channel 10
	RF, Mixer Grid & Osc. Coil	520731	Channel 11
	RF, Mixer Grid & Osc. Coil	520732	Channel 12
	RF, Mixer Grid & Osc. Coil	520733	Channel 13

TROUBLE SHOOTING AIDS — CONT.

PROPERTY OF
T. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

AUDIO

WEAK OR NO SOUND

Substitute V8, V9 and V10. Check circuit acomponents. Check alignment of sound and video IF.

BUZZ

Adjust discriminator secondary for minimum buzz. Substitute V9. Check local oscillator setting. Check for overload at waveform W1. If overloading exists, check AGC network.

DISTORTED

Check audio stages using audio signal generator;

If not distorted,	If distorted,
Check alignment of sound IF and discriminator.	Substitute V9 and V10. Check associated components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check waveform W13;

If not satisfactory,	If satisfactory,
Substitute V14. Check associated components. Check C76 for open.	Substitute V15, V16 and V17. Check fuse in horizontal output primary. Check T3, L27 and other components. of circuit.

WEAK HIGH VOLTAGE

If substitution of V14, V15 and V17 does not correct trouble, follow procedure outlined under loss of high voltage.

BLOOMING

If substitution of V14, V15, V17 and V18 does not correct the trouble, follow procedure outlined under loss of high voltage. Check R89 particularly.

POWER

SMALL RASTER AND WEAK SOUND

Substitute V18. Check filter components. Check B plus circuit for short.

DIM PICTURE

Substitute V18 and check B plus components.

GENERAL

NO SOUND, NO PICTURE, NO SNOW

Substitute V2, V3, V4, V5, V6 and V7. Check associated components.

SNOW BUT NO PICTURE OR SOUND

Substitute V1 and V2. Check associated components.

SNOWY PICTURE, GOOD SOUND (IN STRONG SIGNAL AREAS)

Check video IF tubes and components.

INTERMITTENT STREAKS

Check high voltage circuit for corona leakage and arcing.

L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PHOTOFACT* Folder

*TRADE MARK

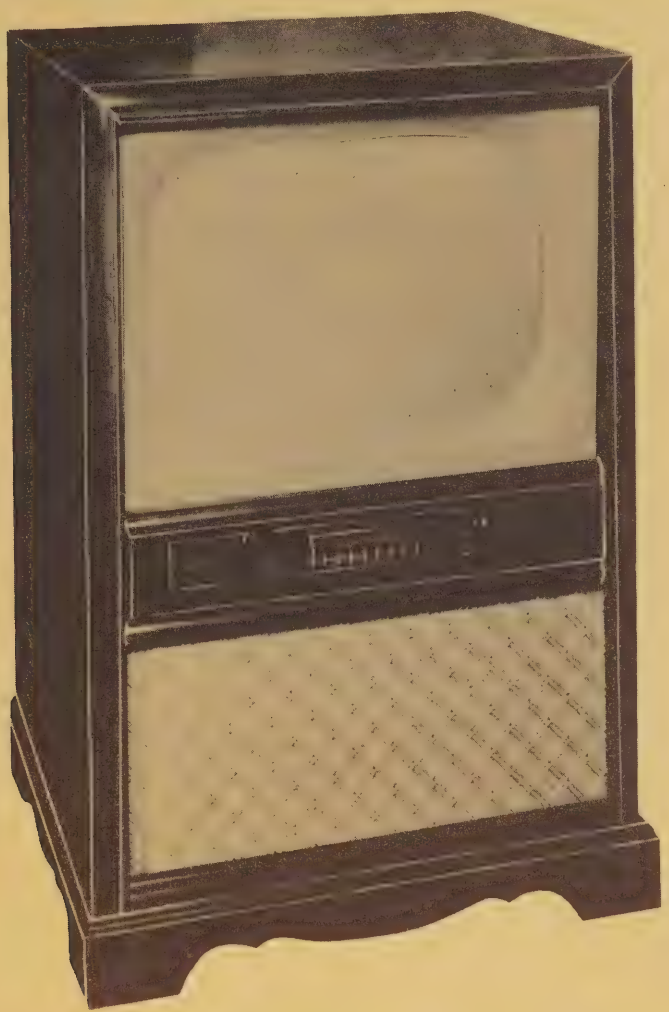
WELLS-GARDNER MODELS 321MS31C-222, -224, -272, -274, -276, -280, -282, -284, -296

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

PROPERTY OF
R. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



MODEL 321MS31C-276

WELLS-GARDNER MODELS 321MS31C-222, -224, -272, -274, -276, -280, -282, -284, -296

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

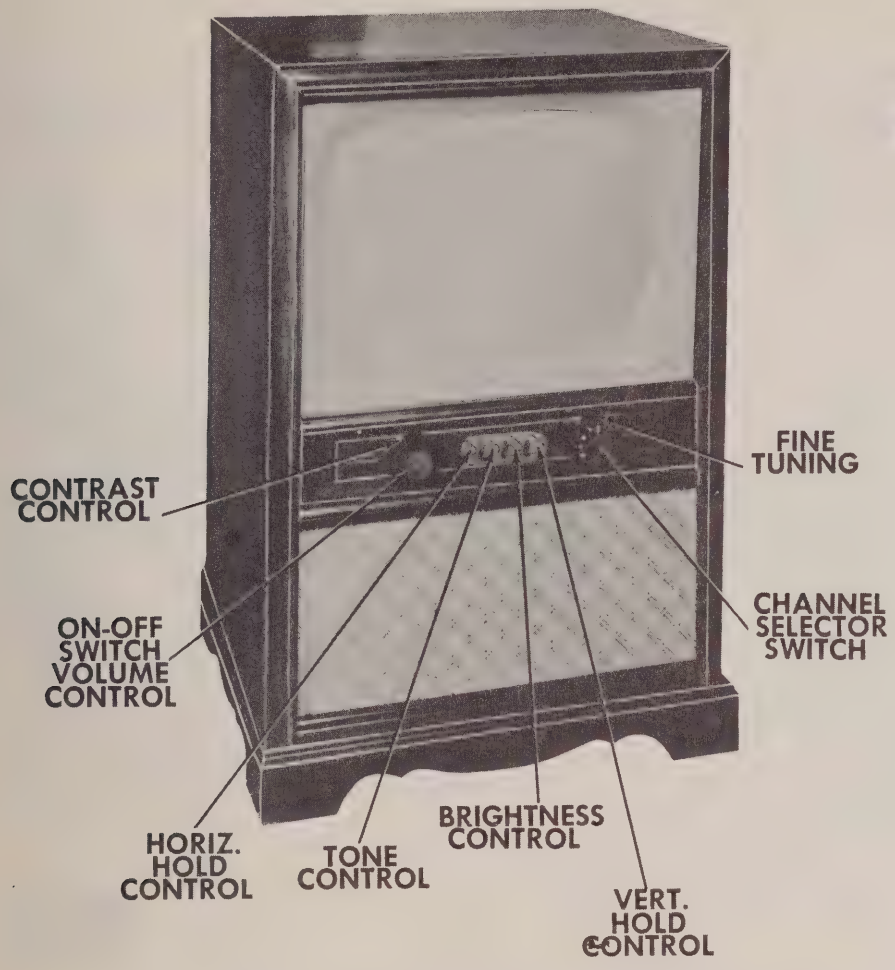
DATE 2-53 SET 194 FOLDER 14

PHOTOFACT* Folder

*TRADE MARK

WELLS-GARDNER MODELS 321MS31C-222, -224, -272, -274, -276, -280, -282, -284, -296

PROPERTY OF



WELLS-GARDNER MODEL 321MS31C-276

TRADE NAME	Wells-Gardner Models 321MS31C-222, -224, -272, -274, -276, -280, -282, -284, -296
MANUFACTURER	Wells-Gardner & Co., 2701 No. Kildare Ave., Chicago, Ill.
TYPE SET	Television Receiver
TUBES	Twenty-three
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.82 Amp. @ 117 Volts AC
TUNING RANGE—	Channels 2 thru 13, Video IF 26.2MC, Sound IF 21.7MC (Intercarrier)

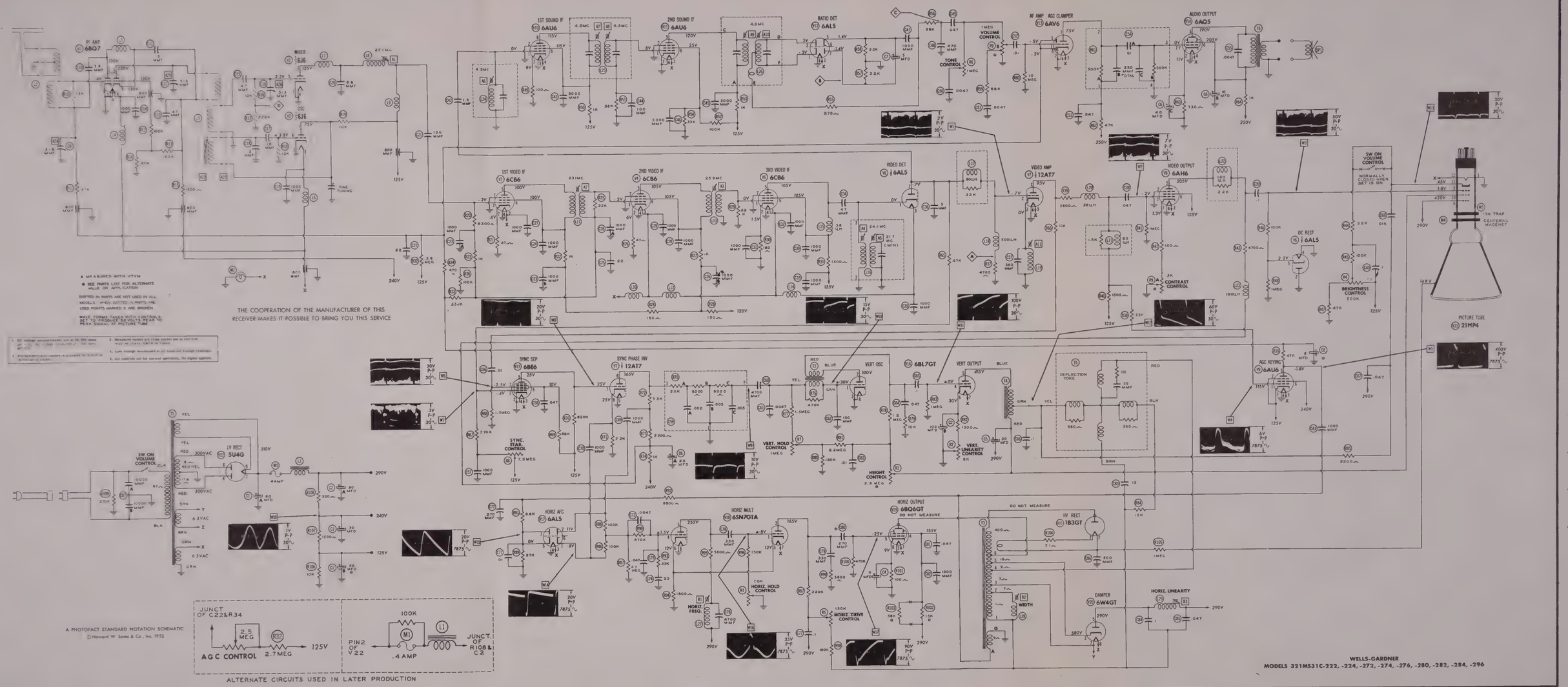
INDEX

Alignment Instructions 6, 7
Disassembly Instructions 11
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions 12, 13, 14
Photographs
Cabinet - Rear View 11
Capacitor and Alignment Identification 4, 9
Chassis - Top View 3
Photographs (Con't)
RF Tuner 10
Resistor and Inductor Identification 15, 16
Resistance Measurements 8
Schematic 2
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

WELLS-GARDNER MODELS 321MS31C-222, -224, -272, -274, -276, -280, -282, -284, -296

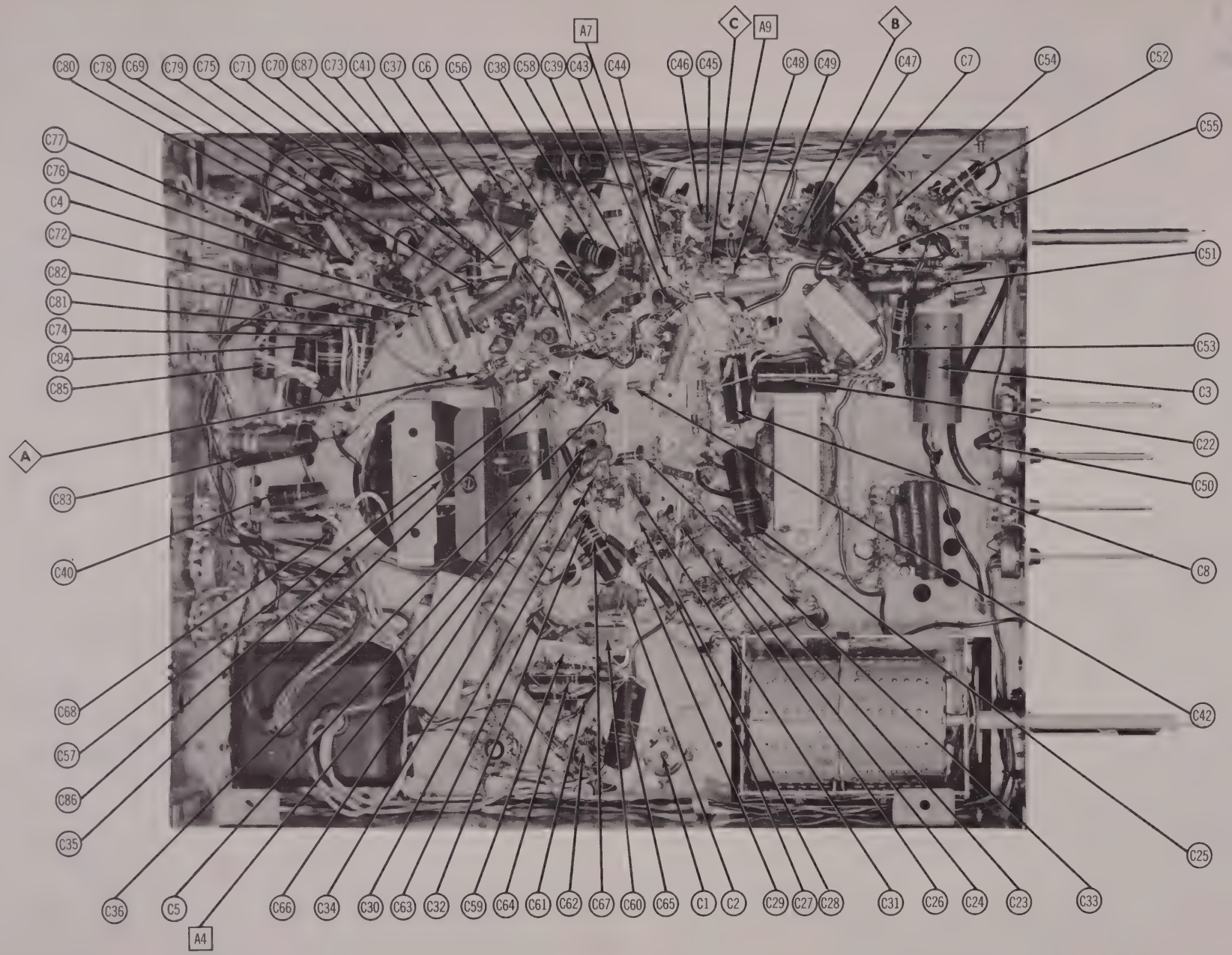
HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America



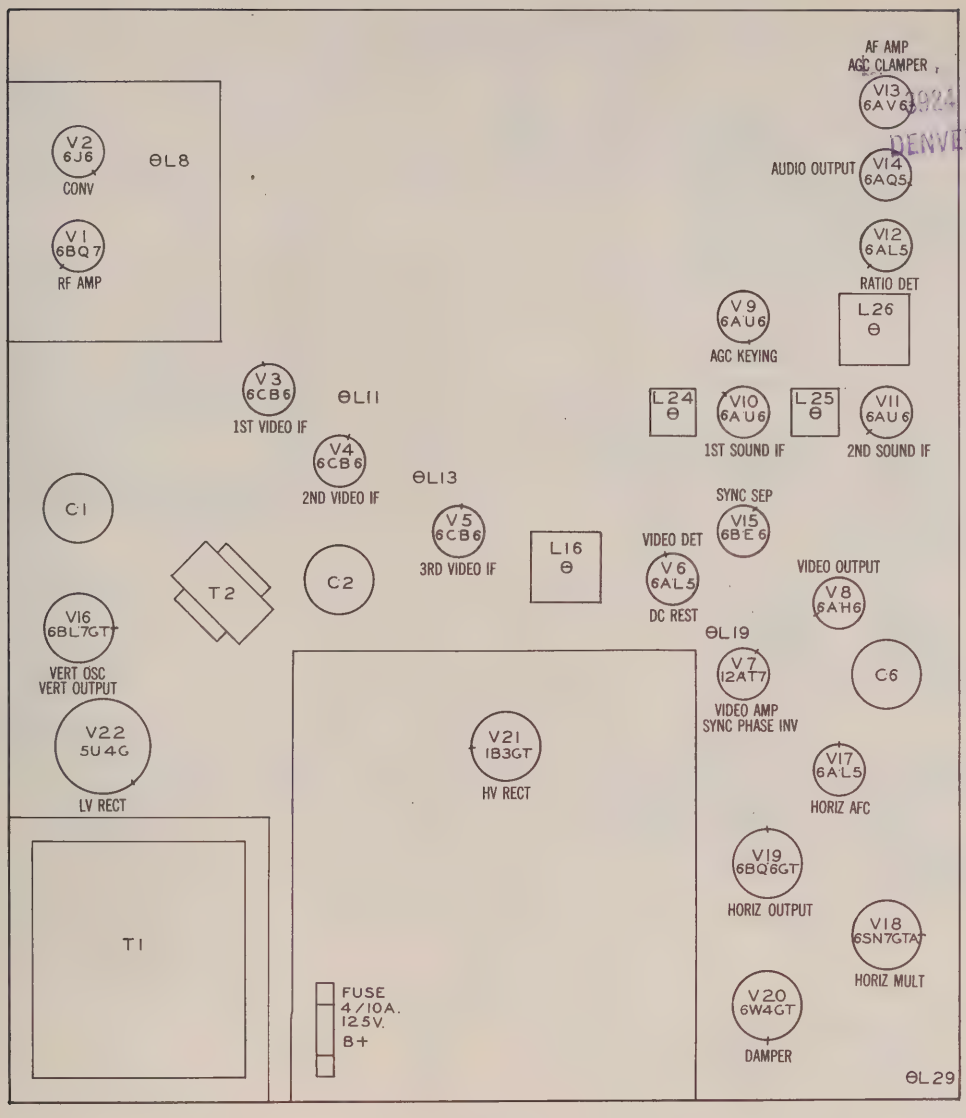
WELLS-GARDNER
MODELS 321MS31C-222, -224, -272, -274, -276, -280, -282, -284, -296

CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



TOP VIEW

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V22, Fuse(M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5, V6
No pic, no sound, has snow-V1, V2, V3
No pid, has sound, has raster-V6, V7, V8, V23
Has pic, ho sound-V10, V11, V12, V13, V14
Overloaded picture-V9, V13

SYNC FAILURE
No vert. sync. -V7, V16
No horiz. sync. -V7, V17, V18
No vert. or horiz. sync. V7, V15

SWEEP FAILURE
No raster, has sound-V18, V19, V20, V21, V23
No vertical deflection-V16
Poor vert. linearity or foldover-V16
Poor horiz. linearity or foldover-V18, V19, V20
Narrow picture-V18, V19, V20, V21, V22
Vert. off freq. -V7, V16
Horiz. off freq. -V7, V17, V18

...Y OF
...KENSHIP
...924 MEADE ST.
DENVER, COLORADO

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal multivibrator tube, V18.

VIDEO IF ALIGNMENT

Remove the converter tube, V2 and replace with a 6J6 which as pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the ungrounded side of C25. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube, V2. Low side to chassis.	25.1MC (Unmod)	Any	DC probe to point Ⓐ Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	23.1MC	"	"	A2	"
3.	"	"	25.9MC	"	"	A3	"
4.	"	"	24.1MC	"	"	A4	"
5.	"	"	21.7MC	"	"	A5	Adjust for MINIMUM deflection.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to an ungrounded tube shield floating over dummy converter tube, V2. Low side to chassis.	24MC (10MC Swp)	21.7MC 23MC 23.5MC 25.25MC 26.2MC	Any	Vert. amp. to point Ⓐ. Low side to chassis.		Check for response curve similar to fig.1 If necessary retouch A1 through A4 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.01MFD	High side to pin 1, (cathode) of 6AL5 (V6) Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point Ⓑ Common to chassis.	A6, A7, A8, A9	Adjust for maximum deflection.
8.	"	"	"	"	DC probe to point Ⓒ Common to chassis.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.01MFD	High side to pin 1 (Cathode) of 6AL5 (V6). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. amp. to point Ⓑ. Low side to chassis.	A6, A7, A8, A9	Disconnect stabilizer capacitor C7. Adjust for curve of maximum amplitude and symmetry as in fig. 2.
8.	"	"	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A10	Reconnect capacitor C7. Adjust so that 4.5MC occurs at center of crossover lines as in fig. 3. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ADJUSTMENT

Turn contrast control to maximum clockwise position.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Direct	High side to pin 7 of 6AL5 (V12).	Not used	4.5MC (400∿Mod.)	Any	Vert. amp. to pin 2 of picture tube.	A11	Adjust for MINIMUM 400∿ indication on scope.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The oscillator adjustment screws for each channel are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. to point Ⓐ. Low side to chassis.	A12	Adjust to place sound marker in notch as in fig. 4. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A13	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A14	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A15	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A16	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A17	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A18	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A19	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A20	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A21	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A22	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A23	

ALIGNMENT INSTRUCTIONS (CONT.)

PROPERTY OF

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. amp. thru 10KΩ to point (D). Low side to chassis.	A24, A25 A26	Adjust for response curve similar to fig. 5. with markers above 90%.
12.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to fig. 5. If markers fall below 70% on any channel make slight compromise adjustments of A24, A25 and A26 with channel switch set that channel, Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

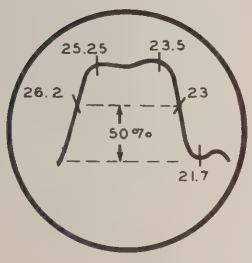


FIG. 1

FIG. 2

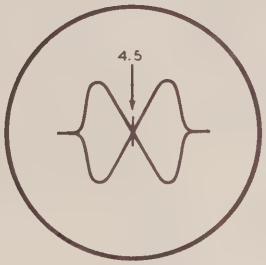


FIG. 3

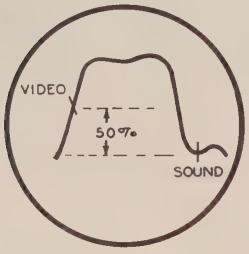


FIG.4

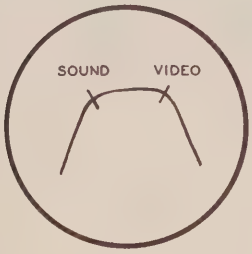
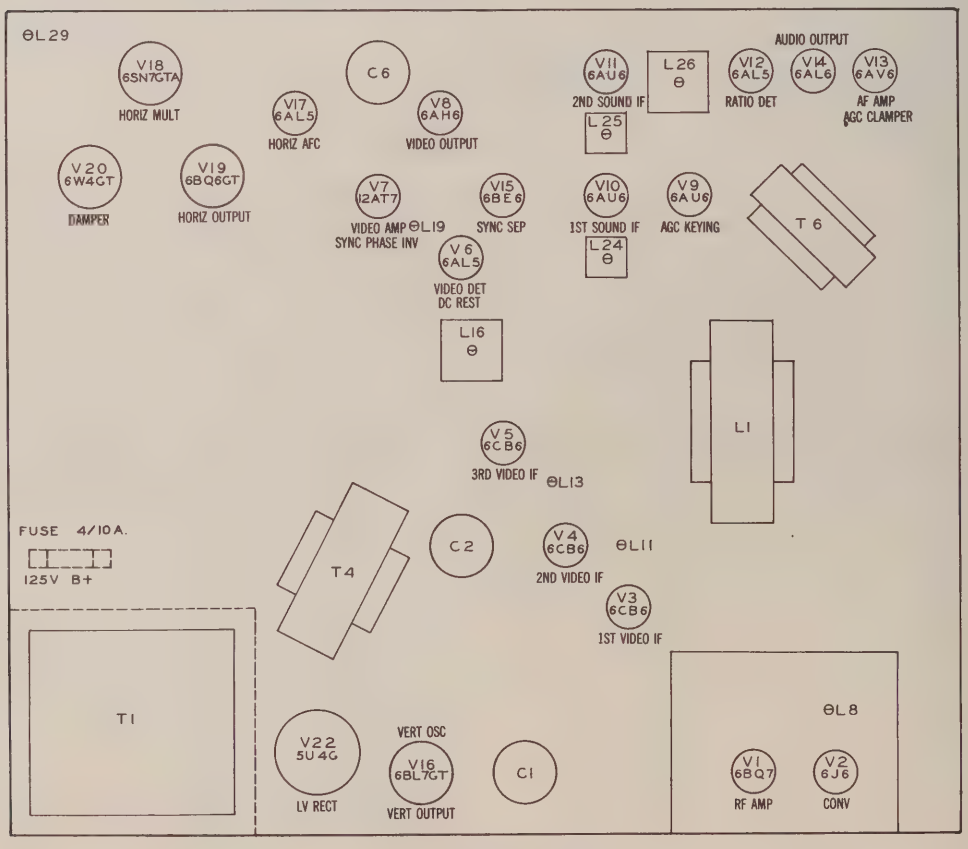


FIG 5

RESISTANCE MEASUREMENTS

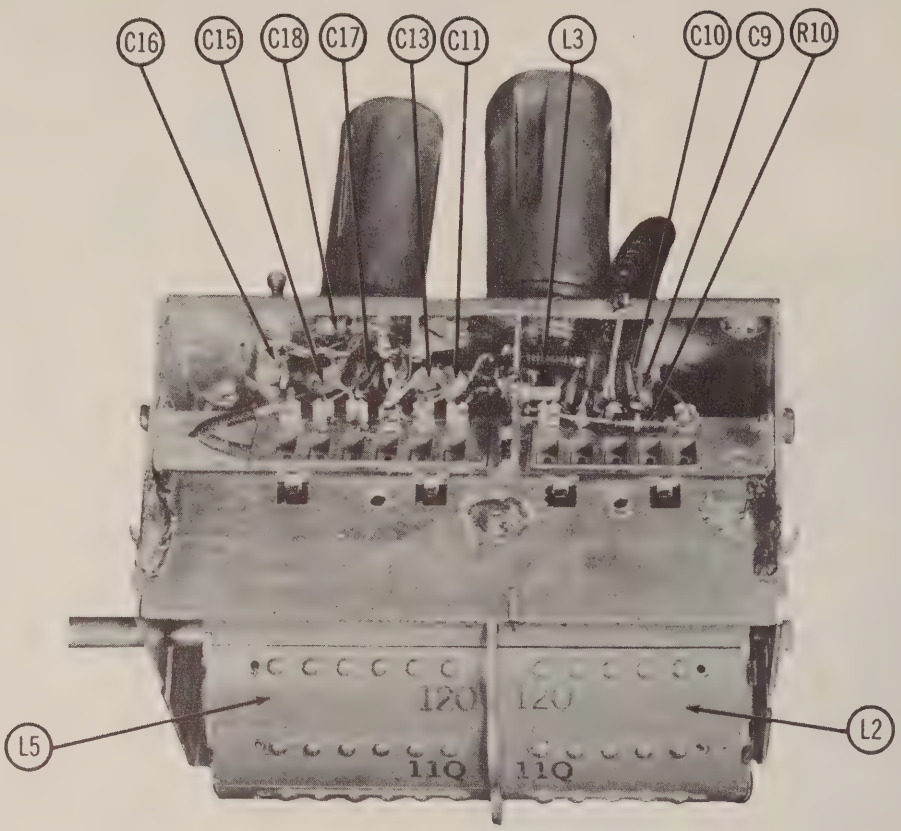
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7	INF	720KΩ	0Ω	.1Ω	0Ω	1.9KΩ	†175KΩ	INF	0Ω
V 2	6J6	†12KΩ	†1.9KΩ	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6CB6	110KΩ	47Ω	.1Ω	0Ω	†3.2KΩ	†3.2KΩ	0Ω		
V 4	6CB6	100KΩ	47Ω	.1Ω	0Ω	†3KΩ	†3KΩ	0Ω		
V 5	6CB6	.3Ω	180Ω	.1Ω	0Ω	†3.4KΩ	†3.4KΩ	0Ω		
V 6	6AL5	.2Ω	0Ω	.1Ω	0Ω	1 Meg	0Ω	4.7KΩ		
V 7	12AT7	†9KΩ	4.7KΩ	.3Ω	0Ω	0Ω	†6.9KΩ	†820KΩ	2.2KΩ	.1Ω
V 8	6AH6	1 Meg	0Ω	.1Ω	0Ω	†6.1KΩ	†1.9KΩ	250Ω		
V 9	6AU6	†36KΩ	†1.9KΩ	.1Ω	0Ω	440KΩ	†380Ω	†1.9KΩ		
V 10	6AU6	2.8Ω	0Ω	0Ω	.1Ω	†2.9KΩ	†2.9KΩ	100Ω		
V 11	6AU6	56KΩ	0Ω	.1Ω	0Ω	†2.9KΩ	25KΩ	0Ω		
V 12	6AL5	INF	INF	.1Ω	0Ω	22KΩ	INF	22KΩ		
V 13	6AV6	10 Meg	0Ω	.1Ω	0Ω	670KΩ	670KΩ	550KΩ		
V 14	6AQ5	500KΩ	330Ω	0Ω	.1Ω	†1.9KΩ	†1.4KΩ	500KΩ		
V 15	6BE6	52KΩ	0Ω	.1Ω	0Ω	†820KΩ	70KΩ	1.5Meg		
V 16	6BL7GT	2.3Meg	#1.6Meg	0Ω	1 Meg	#16KΩ	3KΩ	.1Ω	0Ω	
V 17	6AL5	4.8Meg	4.8Meg	.1Ω	0Ω	8.7KΩ	INF	8.7KΩ		
V 18	6SN7GTA	175KΩ	#420KΩ	1.8KΩ	5.1Meg	†5.7KΩ	1.8KΩ	.1Ω	0Ω	
V 19	6BQ6GT	5.7KΩ	0Ω	INF	†11KΩ	470KΩ	#200KΩ	.1Ω	100Ω	Top Cap #16Ω
V 20	6W4GT	†51Ω	INF	190KΩ	4.7Meg	†67Ω	†51Ω	#16Ω	#16Ω	
V 21	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								Top Cap #416Ω
V 22	5U4G	INF	9.5KΩ	INF	17.4Ω	1.5KΩ	16Ω	INF	9.5KΩ	
V 23	21MP4	0Ω	1.1Meg	Pin 6 †51Ω	Pin 10 #15KΩ	Pin 11 200KΩ	Pin 12 .1Ω			

ALL CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED
† MEASURED FROM PIN 2 OF V22
# MEASURED FROM PIN 3 OF V20

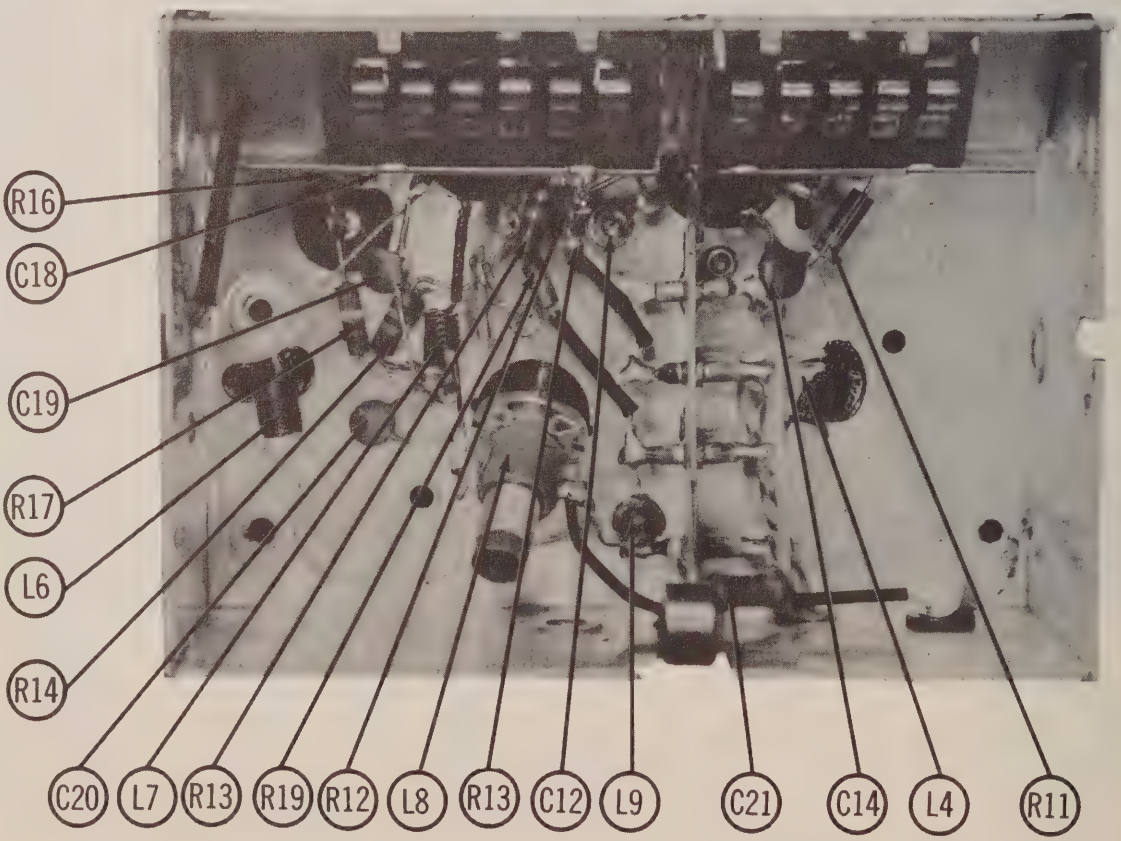


BOTTOM VIEW

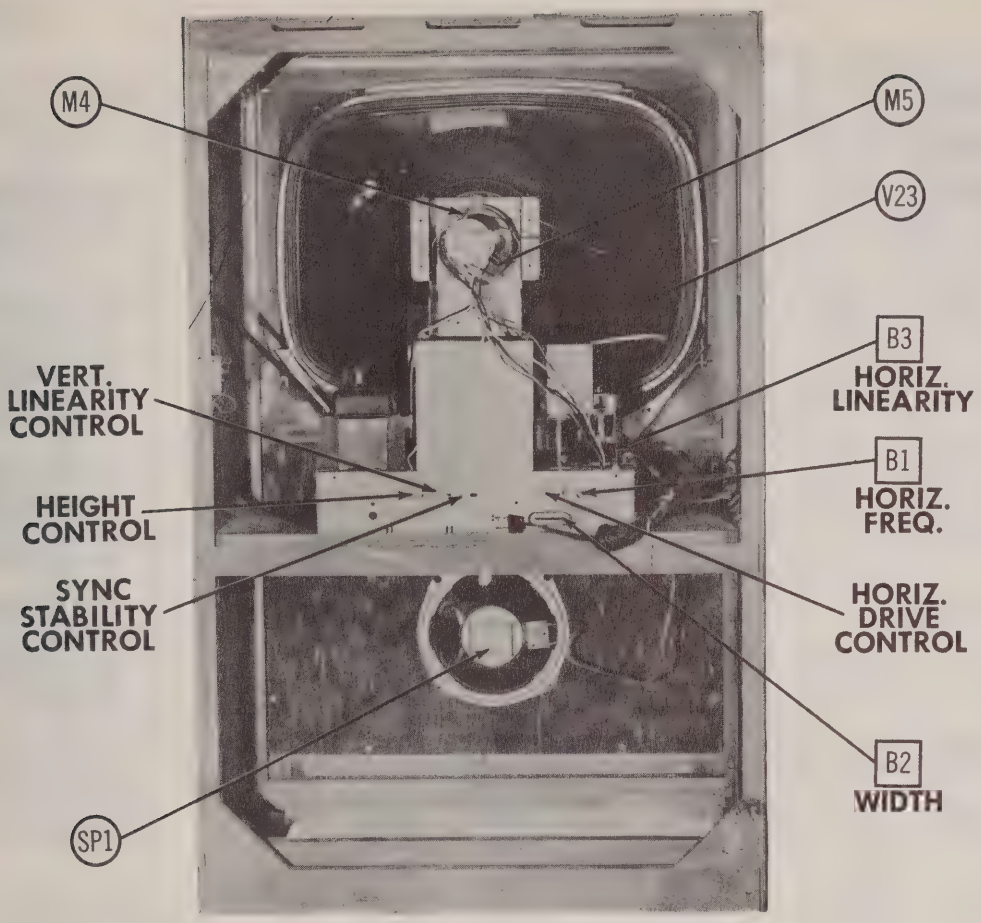
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (B1) until the picture falls into sync.

Adjust the horizontal drive control for the best compromise between brightness and linearity.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

SYNC STABILITY CONTROL ADJUSTMENT

Tune set to strongest TV signal available.

Turn the sync stability control clockwise until bending of the picture occurs at the top, then turn counter clockwise until the bending just disappears.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push on type control knobs from front panel.
2. Remove 2 wood & 2 metal screws. Remove rear cover.
3. Disconnect built-in antenna & speaker.
4. Remove 5 chassis bolts. Remove chassis.
5. Remove 4 speaker nuts. Remove speaker.

NOTE:
FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: Wells-Gardner PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amplifier	6BQ7	6BQ7	8AJ	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Detector-DC Restorer	6AL5	6AL5	6BT	
V7	Video Amplifier-Sync Phase Inv.	12AT7	12AT7	9A	
V8	Video Output	6AH6	6AH6	7BK	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	1st. Sound IF Amp.	6AU6	6AU6	7BK	
V11	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V12	Ratio Detector	6AL5	6AL5	6BT	
V13	AF Amplifier-AGC Clamper	6AV6	6AV6	7BT	
V14	Audio Output	6AQ5	6AQ5	7BZ	
V15	Sync Separator	6BE6	6BE6	7CH	
V16	Vert. Oscillator-Vert. Output	6BL7GT	6BL7GT	8BD	
V17	Horiz. AFC	6AL5	6AL5	6BT	
V18	Horiz. Mult.	6SN7GTA	6SN7GTA	8BD	
V19	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V20	Damper	6W4GT	6W4GT	4CG	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Wells-Gardner PART No.	SYLVANIA PART No.		RTMA BASE TYPE	NOTES
V23	21MP4			12C	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Wells-Gardner PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲80	475	[illegible]	AFH3-46		UPT84245		FP266	TVL-3792	
B	▲50	450								Note 1
C2A	▲80	450	45X391	AFH3-142		UPT4445-V10		FP375	TVL-3764	
B	▲100	50								
C3	30	400	45X393	PRS450/30		BR3045A		TC77	TVA-1711	
C4	5	25	45X378	PRS150/4		BBR-5-50		TC30	TVA-1203	
C5	30	400	45X393	PRS450/30		BR3045A		TC77	TVA-1711	
C6A	▲20	400	45X392	AFH3-137		UPT2145-V5		FP366	TVL-3751	
B	▲10	400								
C	40	50								
C7	5	25	45X378	PRS150/4		BBR-5-50		TC30	TVA-1203	
C8	5	25	45X378	PRS150/4		BBR-5-50		TC30	TVA-1203	Note 2
C9	3-9		31B-207		829-10					
C10	3.6		CD8C3R6C							
C11	1.5		CD8C1R5M	SII.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C12	.5-3		31B-206		829-3			CT565A		
C13	47		CD8X470K	SI47N750	TCN-47		N750K-470	NT-5447	5TCU-Q47	
C14	1000		CD8X102Z	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C15	47		CD8Q470K	SI47N750	TCN-47		N750K-470	NT-5447	5TCU-Q47	
C16	.5-3		31B-206		829-3			CT565A		
C17	10		CD10C100K	SI10N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C18	5		CD8U050C	SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C19	1000		CD8X102Z	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C20	6.8		CD8C6R8C	SI6.8NP0	TCZ-6.8		NP0K-6R8	ZT-5568	5TCCB-V68	
C21	120		13D-055	SII20	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C22	.22	200	RCP10M2224M	P488-22		PTE4P22		PT4025	2TM-P22	
C23A	1000		80X3	BPD-2X001	DD-2-102	TM5DD1	812-001	DCD-521	5HK-2D1	
B	1000									
C24	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C25	.22	200	RCP10M2224M	P488-22		PTE4P22		PT4025	2TM-P22	
C26A	1000		80X3	BPD-2X001	DD-2-102	TM5DD1	812-001	DCD-521	5HK-2D1	
B	1000									
C27	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C28	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C29	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C30	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C31	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C32	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C33	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C34	47		47X603	SI47	D6-470	5R5Q5	GP1K-470	UC-5447	5GA-Q47	
C35	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C36	5		47X562				NP0K-050	ZT-555	5TCCB-V47	
C37	360	500	47X568							
C38	.047	400	RCP10M4473M	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C39	.1	400	RCP10M4104M	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C40	.1	200	RCP10M2104M	P288-1	DF-104	P72P1		PT401	2TM-P1	
C41	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C42	1.5		47X584	SII.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C43	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C44	100		47X504	SII00	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C45	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C46	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C47	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C48	470	500	47X525	1488-0005	D6-471	5W5T5	GP2K-471	MC-245	1FM-35	
C49	.047	200	RCP10M2473M	P288-047	DF-503	PTE4S47		PT4147	2TM-S47	
C50	.0047	400	RCP10M4472M	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C51	.0047	400	RCP10M4472M	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C52	.01	400	RCP10M4103M	P488-01	D6-103	PTE4S1	GP2-333-103	PT4141	4TM-S1	
C53	.047	400	RCP10M4473M	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Wells-Gardner PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C54A	.01									
B	250		†76X5		†PC-80		†1404-01		†102C1	
C										
C55	.0047	600	RCP10M6472M	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6347	6TM-D47	
C56	.01	400	RCP10M4103M	P488-01	D6-103	PTE4S1	GP2-333-103	PT41I	4TM-S1	
C57	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C58	.047	400	RCP10M4473M	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C59A	.002			P688-002		PTE6D2		PT622		
B	.005		♦76X7	P688-005	♦PC-100	PTE6D5	♦1405-01	PT625	♦101C1	
C	.005			P688-005		PTE6D5		PT625		
C60	4700	500	47X543	1464-005		1DR5D5		MCB465	MS-25	
C61	.0047	400	RCP10M4472M	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C62	100		47X604	SII00	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C63	.01	600	RCP10M6103M	P688-01	D6-103	PTE6S1	GP2-333-103	PT61I	6TM-S1	
C64	.047	600	RCP10M6473M	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C65	.1	600	RCP10M6104M	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C66	.1	600	RCP10M6104M	P688-1	DF-104	PTE6 P1		PT601	6TM-P1	
C67	.047	600	RCP10M6473M	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C68	.015	600	RCP10M6153M	P688-015		PTE6S15		MCB465	MS-25	
C69	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C70	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C71	.01	400	RCP10M4103M	P488-01	D6-103	PTE4S1	GP2-333-103	PT41I	4TM-S1	
C72	270	500	RCM20A271K	1469-0003		5R5T3		MCB241	MS-33	
C73	.0047	600	RCP10M6472M	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C74	.22	200	RCP10M2224M	P488-22		PTE4P22		PT4025	2TM-P22	
C75	.047	300	RCP10M2473M	P288-047	DF-503	PTE4S47		PT4147	2TM-S47	
C76	4700	500	47X543	1464-005		1DR5D5		MCB465	MS-25	
C77	.1	600	RCP10M6104M	P688-1	DF-104	PTE6P1		PT601	6TM-S1	
C78	330	500	47X570	1469-00035						
C79	330	500	47X570	1469-00035						
C80	270	500	RCM20A271K	1469-0003		5R5T3		MCB241	MS-33	Note 3
C81	.047	400	RCP10M4473M	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C82	1000		80X1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C83	.15	400	RCP10M4154M	P488-15		PTE4P15			4TM-P15	
C84	.1	400	RCP10M4104M	P488-1		PTE4P1		PT401	4TM-P1	
C85	.047	400	RCP10M4473M	P488-047		PTE4S47		PT4147	4TM-S47	
C86	500	30000	47X560	HV30C	TV3-502	MMC-20T5	413-501		20DK-T5	
C87A	10000		†76X8	BPD-01	DD-3-103	TM5DS1	821-01	DC-511	5HK-2S1	
B	10000			BPD-01			821-01	DC-511		

Note 1. Some models use 60MFD in this application.
Note 2. Some models use 4MFD in this application (Part #45X361)
Note 3. Some models use 180MMF in this application (Part #47X564)
♦ Items C59A, C59B, C59C, R75A, R75B, R75C are combined in one unit.
† Items C54A, C54B, C54C, R61A, R61B are combined in one unit.
When replacing items separately C54B, C54C should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Wells-Gardner PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	50KΩ	½	40X361A	Q11-123	AG-44-S	AB-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	RS-3/16	AK-4	Not Req.	Attach to R1A
R2A	8KΩ	½	40X362	Q11-116	AG-27-S	AB-14	SU-20	Vert Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R2A
R3A	2.5Meg	½	40X364	Q11-239	AG-84-S	AB-83	SU-565	Height-Note 1
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R3A
R4A	500KΩ	½	B40X333-A	Q11-133	AG-58-S	AB-59	U-50	Brightness
B	Shaft		Not Req.	Not Req.	RS-3/16	AK-4	Not Req.	Attach to R4A
R5A	150KΩ	½	B40X331-A	Q11-129	AG-52-S	AB-46	U-43	Horiz. Drive
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R5A
R6A	1 Meg	½	B 40X334-D	Q11-137	AG-61-S	AB-69	U-54	Tone
B	Shaft		Not Req.	Not Req.	RS-3/16	AK-4	Not Req.	Attach to R6A
R7A	1 Meg	½	B40X334-D	Q11-137	AG-61-S	AB-69	U-54	Vert. Hold
B	Shaft		Not Req.	Not Req.	RS-3/16	AK-4	Not Req.	Attach to R7A
R8	7.5Meg	½	40X293C					Sync. Stability
R9A	3000Ω	½	78X12	Q1-337 *				Contrast-Panel-Note 2
B	1 Meg	½						Volume & Sw. - Tapped ④ 200KΩ - Rear

* CONCENTRIKIT EQUIVALENT, KIT K-2, BASE ELEMENTS & SHAFTS B17-112 & P1-310 (Panel) B13-137 & R2-332(Rear) & SWITCH 76-2

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Wells-Gardner PART No.	IRC PART No.	NOTES
R10	15KΩ	½	12A-004	BTS-15K	
R11	47KΩ	½	12A-039	BTS-47K	
R12	100KΩ	½	12A-094		
R13	100KΩ	½	12A-186	BTS-100K	
R14	160KΩ-5%	½	12A-187	BTS-160K-5%	
R15	1500Ω	½	12A-183	BTS-1500	
R16	10KΩ	½	12A-040	BTS-10K	
R17	220KΩ	½	12A-041	BTS-220K	
R18	10KΩ	½	12A-040	BTS-10K	
R19	10KΩ	½	12A-040	BTS-10K	
R20	8200Ω	½	B83823		
R21	47Ω	½	B83470		
R22	1000Ω	½	B85102	BTS-1000	
R23	1000Ω	½	B85102	BTS-1000	
R24	150Ω	½	B85151	BTS-150	
R25	22KΩ	½	B83223		
R26	47Ω	½	B83470		
R27	1000Ω	½	B85102	BTS-1000	
R28	150Ω	½	B85151	BTS-150	
R29	22KΩ	½	B83223		
R30	180Ω	½	B84181	BTS-180	
R31	1500Ω	½	B84152	BTS-1500	
R32	3.9Meg-5%	½	B83395	BTS-3.9Meg-5%	
R33	330KΩ-5%	½	B83334	BTS-330K-5%	
R34	470KΩ	½	B84474	BTS-470K	
R35	47KΩ	½	B84473	BTS-47K	
R36	100KΩ	½	B84104	BTS-100K	
R37	4700Ω-5%	½	B83472	BTS-4700-5%	
R38	33KΩ	½	B84333	BTS-33K	
R39	5600Ω	1	C84562	BTA-5600	
R40	1500Ω	½	B84152	BTS-1500	
R41	1 Meg	½	B84105	BTS-1 Meg	
R42	100Ω	½	B84141	BTS-100	
R43	4700-5%	1	C84472	BTA-4700-5%	
R44	22KΩ	½	B84223	BTS-22K	
R45	100KΩ	½	B85104	BTS-100K	
R46	100KΩ	½	B85104	BTS-100K	
R47	47KΩ	½	B85473	BTS-47K	
R48	1 Meg	½	B84105	BTS-1 Meg	
R49	100Ω	½	B84101	BTS-100	
R50	1000Ω	½	B85102	BTS-1000	
R51	56KΩ	½	B84563		
R52	100KΩ	½	B84104		
R53	1000Ω	½	B85102	BTS-1000	
R54	33KΩ	½	B84333	BTS-33K	
R55	270Ω	½	B84271	BTS-270	
R56	68KΩ	½	B84683	BTS-68K	
R57	22KΩ	½	B84223	BTS-22K	
R58	22KΩ	½	B84223	BTS-22K	

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Wells-Gardner PART No.	IRC PART No.	NOTES
	68KΩ	½	B84683	BTS-68K	
R60	10 Meg	½	B85106	BTS-10 Meg	
R61A	500KΩ	½	†76X5		
B	500KΩ	½			
R62	47KΩ	½	B85473	BTS-47K	
R63	3300Ω	1	C84331	BTA-330	
R64	1000Ω	2	B84102	BTB-1000	
R65	47KΩ	½	B84473	BTS-47K	
R66	10KΩ	½	B84103	BTS-10K	
R67	270KΩ	½	B84274	BTS-270K	
R68	1.5 Meg	½	B84155	BTS-1.5 Meg	
R69	68KΩ	½	B84683	BTS-68K	
R70	820KΩ	½	B84824	BTS-820K	
R71	2200Ω	½	B83222	BTS-2200	
R72	3300Ω	½	B84332	BTS-3300	
R73	2200Ω-5%	½	B83222	BTS-2200-5%	
R74	10000Ω	½	B84102	BTS-10000	
R75A	22KΩ	½		BTS-22K	
B	8200Ω	½	♦ 76X7	BTS-8200	
C	8200			BTS-8200	
R76	470KΩ	½	B85474	BTS-470K	
R77	1.5 Meg	½	B84155	BTS-1.5 Meg	
R78	1.2 Meg	½	B 84125	BTS-1.2 Meg	
R79	10KΩ	½	B84103	BTS-10K	
R80	180KΩ	½	B84184	BTS-180K	
R81	2.2 Meg	½	B84225	BTS -2.2 Meg	
R82	1500Ω	½	B84152	BTS-1500	
R83	1 Meg	½	B85105	BTS-1 Meg	
R84	15KΩ	2	D84153	BTB-15K	
R85	2200Ω	½	B84222	BTS-2200	
R86	100KΩ	½	B84104	BTS-100K	
R87	4.7Meg	½	B85475	BTS-4.7Meg	
R88	100KΩ	½	B84104	BTS-100K	
R89	27KΩ	½	B84273	BTS-27K	
R90	470KΩ	½	B85474	BTS-470K	
R91	6800Ω	½	C84682	BTS-6800	
R92	6800Ω	½	C84682	BTS-6800	
R93	33KΩ	½	B85333	BTS-33K	
R94	18000-5%	½	B83182	BTS-1800-5%	
R95	5600Ω	1	C83562	BTA-5600	
R96	150KΩ	½	B83154	BTS-150K	
R97	220KΩ	½	B83224	BTS-220K	
R98	100KΩ	½	B84104	BTS-100K	
R99	5600Ω	½	B84562	BTS-5600	
R100	470KΩ	½	B84474	BTS-470K	
R101	100Ω	2	D84101	BW-2-100	
R102	15KΩ	2	D84153	BTB-15K	Note 1
R103	56KΩ	½	B84563	BTS-56K	Note 2
R104	5.1Ω	½	43X239		
R105	1 Meg	1	C85105		
R106	10KΩ	5	43X272	1 3/4A-10K	
R107	1500Ω	15	43X275	2D-1500	
R108	330Ω	10	43X273	1 3/4 A-350	
R109	270KΩ	½	B85274	BTS-270KΩ	

Note 1 Some models use a 12KΩ resistor in this application.
Note 2 Not used in all models
† Items R61A, R61B, C54A, C54B, C54C are combined in one unit.
♦ Items R75A, R75B, R75C, C59A, C59B, C59C are combinedin one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: Wells-Gardner PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC ⑤ 1.82 A	600VCT ② .240ADC	5VAC ③ 3A	6.3VAC ⑤ 1.1A	53X324		P-3077 P-3074 ①		
				SEC. 4 6.3VAC 8.8A					

① Use for Secondary #3.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: Wells-Gardner PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	194Ω	1100Ω	54X8	A-8125	A-3000 ①	TBO-2 ①	A-97X	Vert. Osc. Trans. Horiz. Output Trans.
T3	440Ω tap ⑥ 12Ω, 8Ω	9Ω SEC. 2	53X326					
	15 Ω, 24Ω, 40Ω	0Ω						
T4	1600Ω		51X156	A-8141	A-3039		A-104X	Vert. Output Trans.
	Tap ⑥ 4.5Ω							
T5A	18Ω		9A2256	DY-9A	MDF-70	TY-3	Y-17	Horiz. Deflection Coils
B	50Ω		9A2274 ②					Vert. Deflection Coils

1. Drill one new mtg. hole.
2. Alternate deflection yoke.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: Wells-Gardner PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T6	5.8KΩ	3.2Ω	495Ω	.9Ω	51X150A	A-3850	A-2981	RO-301	S-3X	

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: Wells-Gardner PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	8"	PM	3.7Ω	C-12A477 12A504 ① 12A502 ②	ST-115 Mod. P8-V	8A21	① Alternate 6" PM Speaker ② Alternate 12" PM speaker

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA: Wells-Gardner PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.250A	51Ω	2.2 Hy.	52X90	C-2321 ①	C-2991 ①	TR-3300 ①	C-25A

① Drill one new mtg. hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: Wells-Gardner PART No.	MERIT PART No.	NOTES
L2	Ant. Coil	0Ω	0Ω	9A2278-1		Channel 2
L3	RF Choke	0Ω		31B-296		
L4	Fil. Choke	0Ω		34A-546		
L5	RF, Mixer Grid & Osc. Coils	0Ω		9A2279-1		Channel 2
L6	Fil. Choke	0Ω		34A575		
L7	RF Choke	0Ω		31B-295		

COURTESY OF HAMFISHOP.COM

PARTS LIST AND DESCRIPTIONS (Continued)

(COILS RF-IF) CONT.

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	Wells-Gardner PART No.	MERIT PART No.	
L8	1st. Video IF	1.1Ω		31A-078	TV-112	
L9	RF Choke	1.2Ω		31B-239		
L10	Fil. Choke	0Ω		9A2033		
L11	2nd. Video IF	.3Ω	.3Ω	9A2230		
L12	Fil. Choke	0Ω		9A2033		
L13	3rd. Video IF	.3Ω	.3Ω	9A2230		
L14	Fil. Choke	0Ω		9A2033		
L15	RF Choke	2.5Ω		9A1979	TV-180	36 Microhenries
L16	4th. Video IF	.1Ω		9A2226	TV-101	Includes Trap
L17	Series Peaking Coil	7.5Ω		36A10		60 Microhenries wound 22K resistor
L18	Shunt Peaking Coil	24Ω		36A11		500 Microhenries
L19	4.5MC Trap	.3Ω		9A2074	TV-151	
L20	Series Peaking Coil	2.5Ω		9A1979	TV-180	36 Microhenries
L21	Shunt Peaking Coil	7.5Ω		36A10		60 Microhenries wound on 1.5K resistor
L22	Series Peaking Coil	12.5Ω		36A12	TV-182	160 Microhenries wound on 22K resistor
L23	Shunt Peaking Coil	14Ω		36A2	TV-184	190 Microhenries
L24	1st. Sound IF	2.8Ω		9A2168		
L25	2nd. Sound IF	1.7Ω	1.7Ω	9A2170	TV-113	
L26	Ratio Det.	3.4Ω	.7 CT	9A2269		Tertiary winding .15Ω
L27	Horiz. Osc.	48Ω		9A2096	TV-163	
L28	Width Coil	.6Ω		9A2183		
L29	Horiz. Lin.	16Ω		9A2262		

FUSES

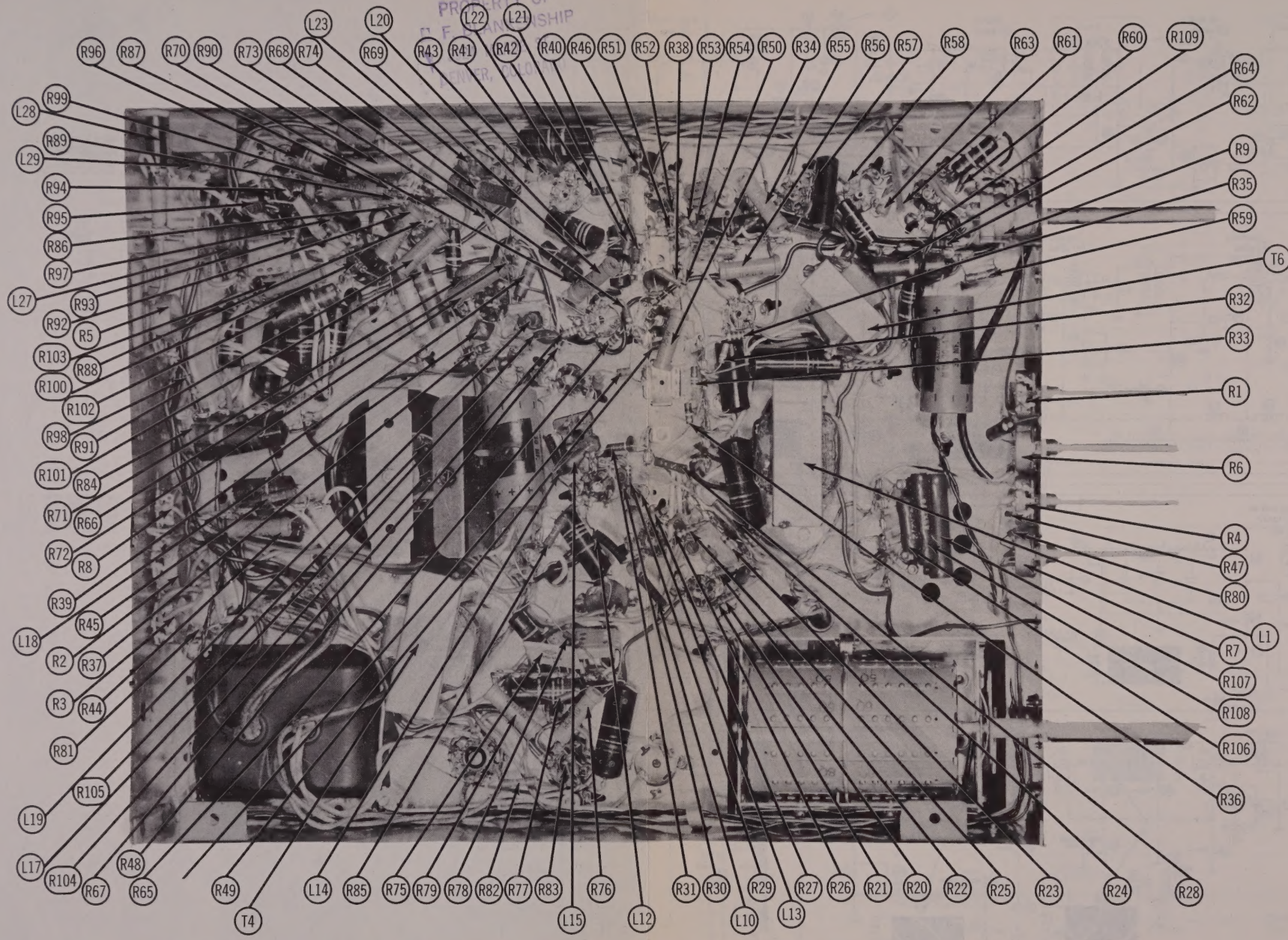
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Wells-Gardner PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG-Slo-Blo	4/10 A. 125V	16X147-3	16X146	313.400	357001	MDL-4/10	4405

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					Wells-Gardner PART No.		
M2	Bayonet	7.5	.2	white	7A32		Type #51

MISCELLANEOUS

ITEM No.	PART NAME	Wells-Gardner PART No.	NOTES
M3	RF Tuner	25A1095	
M4	Centering Magnet	2A419	
M5	Ion Trap	2A407	
	Ant. Coils	9A2278-2	Channel #3
	Ant. Coils	9A2278-3	Channel #4
	Ant. Coils	9A2278-4	Channel #5
	Ant. Coils	9A2278-5	Channel #6
	Ant. Coils	9A2278-6	Channel #7
	Ant. Coils	9A2278-7	Channel #8
	Ant. Coils	9A2278-8	Channel #9
	Ant. Coils	9A2278-9	Channel #10
	Ant. Coils	9A2278-10	Channel #11
	Ant. Coils	9A2278-11	Channel #12
	Ant. Coils	9A2278-12	Channel #13
	RF, Mixer Grid & Osc. Coil	9A2279-2	Channel #3
	RF, Mixer Grid & Osc. Coil	9A2279-3	Channel #4
	RF, Mixer Grid & Osc. Coil	9A2279-4	Channel #5
	RF, Mixer Grid & Osc. Coils	9A2279-5	Channel #6
	RF, Mixer Grid & Osc. Coil	9A2279-6	Channel #7
	RF, Mixer Grid & Osc. Coil	9A2279-7	Channel #8
	RF, Mixer Grid & Osc. Coil	9A2279-8	Channel #9
	RF, Mixer Grid & Osc. Coil	9A2279-9	Channel #10
	RF, Mixer Grid & Osc. Coil	9A2279-10	Channel #11
	RF, Mixer Grid & Osc. Coil	9A2279-11	Channel #12
	RF, Mixer Grid & Osc. Coil	9A2279-12	Channel #13
	Knob	10A779	Off/On Volume
	Knob	10A812-1	Channel Selector — Models 321MS31C-222, -272, -274, -276
	Knob	10A821-1	Contrast
	Knob	10A-820-1	Fine Tuning
	Knob	10A812-4	Off/On Volume
	Knob	10A812-3	Channel Selector — Models 321MS31C-224, -280, -282, -284, -296
	Knob	10A821-3	Contrast
	Knob-	10A820-2	Fine Tuning



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION